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ABSTRACTS OF TUBERCULOSIS

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New Disinfectant for Tuberculous Sputum.—The difficulty in disinfecting tuberculous sputum depends upon the presence of protein material, mucin, fats and pus cells which surround the tubercle bacillus. These substances are acted upon by most chemicals; they combine with inorganic salts like mercuric chloride, with acids and with aldehydes (formaldehyde) through their amido group; they dissolve or absorb phenols and are partly precipitated by them. The ideal disinfectant for sputum should not coagulate proteins; it should, if possible, be nonpoisonous so that eating untensils can be sterilized with it; it should be relatively free from disagreeable odors; and it should also be suitable for the disinfection of handkerchiefs, so much used by tuberculous patients as receptacles for their sputum instead of the more conspicuous sputum box or bottle. The fact that sputum is readily liquefied by alkalies was made use of in order to obtain an ideal sputum disinfectant. Alkali was combined with various cresol and lysol compounds manufactured in Germany and it was found that one of these, named *parol*, in 3 to 5 per cent solution, combined with 15 per cent sodium hydroxide, disinfected tuberculous sputum in two to four hours, rendering the latter entirely homogeneous and thus exposing the bacilli to the action of the disinfectant. This preparation is entirely odorless. It is advisable to add twice the volume of the disinfectant to the sputum.—*Neue Verfahren zur Disinfektion von tuberkulösem Auswurf, P. Uhlenhuth, Zeitschr. f. Tuberk., October, 1921, xxxiv, 589.*

Recent Regulations for Tuberculosis Disinfection in Prussia.—The regulations for disinfection are embodied in a circular in three parts. In the first part the cause of tuberculosis and its mode of transmission are explained. In the second are directions for the proper disinfection of sickrooms, clothing, eating utensils, books, sputum, urine and feces. The third part of the circular instructs that in case of death all articles that have come in contact with the patient should be disinfected. A 5 per cent solution of bichloride of mercury should be used for the floors of the sickroom and for the walls near the patient's bed. This solution is considered adequate to disinfect against tuberculosis. The feces and urine are disinfected with lime and the linen by boiling.—*Die neuen preussischen Disinfektionsvorschriften bei Tuberkulose, O. Lentz, Zeitschr. f. Tuberk., October, 1921, xxxiv, 585.*

Relation of Other Diseases to Tuberculosis.—*Cancer and tuberculosis:* From autopsy statistics cancer and tuberculosis of the same organ occurred in no case. Cancer as a contributory cause of death with tuberlosis or even cancer combined with active tuberculosis is very rare. With inactive tuberculosis, cancer is relatively frequent; nevertheless, less frequent than in cases in which no tuberculosis has been demonstrated. The lower the tuberculosis mortality in a country, the higher the mortality from cancer, even when we figure the mortality in relation to the number of living. *Ulcer of the Stomach and Tuberculosis:* The author found 4.5 per cent of 2243 tuberculous patients with ulcus verntriculi. The various theories to account for its occurrence are mentioned, such as pressure upon the vagi by cicatricial tissue and enlarged lymph nodes, injury of the blood vessels in the neighborhood of the ulcer due to tuberculo-toxin, and, finally, as in the case of cancer, the author ascribes its occurrence to constitutional anomaly. *Kyphoscoliosis and Tuberculosis:*

The occurrence of tuberculosis of all kinds among 53 patients with kyphoscoliosis was was found to be 54.7 per cent. However, only 10 per cent of these died of tuberculosis, and of the other 44.7 per cent only 7 per cent were actively tuberculous, the rest being only latent healed cases. This makes a total of 17 per cent of active tuberculosis cases among those with kyphoscoliosis, whereas the general death rate from tuberculosis in Prague is 20 per cent. Hence kyphoscoliosis does not predispose to tuberculosis; in fact, the contrary condition prevails. This condition confers a considerable resistance to the development of active tuberculosis. The death rate from tuberculosis in kyphoscoliosis is scarcely half as large as in other individuals. The more marked the kyphoscoliosis the greater is the resistance of the individual to tuberculosis.—*Über Tuberkulose und ihre Beziehung zu Karzinom, Ulcus ventriculi, Kyphoscoliose und anderweitigen pathologischen Prozessen, B. Hirschowitz, Zeitschr. f. Tuberk., January, 1922, xxxv, 327.*

Newer Classification of Pulmonary Tuberculosis.—A summary review and critical consideration of the newer proposals for the classification of pulmonary tuberculosis into definite forms and groups are given. The use of stage divisions is considered as poorly chosen since the disease only incompletely passes through definite stages and, therefore, this does not actually describe what is desired. The ideal classification has thus far not been achieved, probably because it has been aimed to please both the views of the clinician and the pathologist. A practically serviceable classification should be determined by the aid of clinical diagnostic means, in which naturally the pathologic-anatomic conditions must come into important consideration in so far as they can be determined by these diagnostic means. The Bacmeister classification in which the group II is replaced by the Fraenkel-Albrecht suggestions is chosen as most acceptable. It is hoped that continued discussion of this important problem will lead to a practically serviceable and generally satisfactory classification.—*Über die neueren Vorschläge zur Stadieneinteilung der Lungentuberkulose, R. Michel, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 37.*

Clinical Types of Tuberculosis in Different Age-Groups and Races.—In tuberculosis there are two main orders of pathological phenomena: (1) those of primary localization and (2) those of secondary localization. The lesions of primary localization are defined as those confined to the area that includes the point of entry, the neighboring lymph nodes and the lymphoid tissue and lymphatic vessels that lie between. The lesions of secondary localization result from the escape of infective material from the sites of bacterial multiplication in the area of primary localization. This escape may be along internal surfaces (respiratory or alimentary tract) but it is commonest by the blood. Dissemination may occur by way of the right side of the heart when the first line of filtration is in the capillary bed of the lungs, or by way of the left side of the heart, to find further filtration areas in the spleen, bone marrow, synovia and lymphatic nodes. In infants and young children primary localizations are more manifest in the lymphatic nodes than at the actual point of entry, the lesions tend to caseation, and generalization is frequent. In young adults, generalization is less common, primary localization is more marked in the neighborhood of the points of entry, and there is danger of local spread by continuity of tissue. In middle-aged groups the general tendency is towards fibrosis and successful localization, especially in the lungs. These types are well defined in England, but this is not true for all parts of the world. In the Senegalese the type is comparable to that of European infants; in the inhabitants of Indo-China, to that of European children and adolescents; in the Coastal Arabs it is only a little more severe than in European adults. In Wales the proportion of adolescents and young adults affected with acute forms of tuberculosis is greater than in England. These differences are determined by various factors such as accidental circumstances as emphasized by Krause, the source of infecting bacilli which may determine whether the manner of infection may be primarily respiratory or alimentary, and the patency of the lymph channels, mechanical obstruction of which may, according to the work of Willis, help to determine the localization of tubercle bacilli in the lungs. The chief factor is that of acquired resistance since tissue allergy plays a large part in localization of the germs. It may be formulated as an invariable rule that, when in a given community the percentage of positive Pirquets tends to be high, the clinical type in that community will tend to be localized and chronic, and the death rate that of the middle-aged type, and that when the percentage of positive von Pirquet tests is low, the prevalent clinical type will tend to be acute, generalized and characterized by the young adult type of mortality.—*The Clinical Difference in the Course of Tuberculosis Seen in Various Age-Groups and Races, S. L. Cummins, J. State Med., May, 1922, xxx, 203.*

Declining Tuberculosis Death Rate in Adult Life.—In March, 1921, attention was directed to the fact that the fall in the tuberculosis death rate was selective, that is, the death rate tended to decline most rapidly at those age groups where the rates were highest and where the disease caused the heaviest social damage. This tendency has continued since the last statistics were published for the Industrial Department of the Metropoltitan Life Insurance Company. A comparison between the first quarters of 1922 and 1921 shows at all ages combined a fall of 8.7 per cent in the death rate for tuberculosis of the lungs. At the age period 25 to 34 years, where the highest death rate is recorded, the decline since 1921 has been 11.8 per cent. Declines of more than 10 per cent were also observed at the ages under 15 years and above 65 years. The following table gives a comparison of the tuberculosis experience of the total Industrial Department of this Company during the first quarters of 1922 and 1921:

Death Rates per 100,000 Exposed. Tuberculosis of the Lungs. First Quarters of 1922 and 1921 Compared

AGE PERIOD	FIRST QUARTER OF		PER CENT DECLINE 1922 SINCE 1921
	1922	1921	
All ages—1 and over	104.4	114.3	8.7
1 to 14	11.9	13.3	10.5
15 to 24	137.5	152.4	9.8
25 to 34	172.6	195.7	11.8
35 to 44	167.9	183.3	8.4
45 to 64	150.2	152.7	1.6
65 and over	151.6	171.9	11.8

The declines in tuberculosis mortality have been especially marked among white males in those age ranges of adult life where family responsibilities are heaviest. We have calculated that the decline in the pulmonary tuberculosis death rate between 1911 and 1920 among white males 15 years of age and over represents a gain of 5,118 lives during 1920 in this group alone. Furthermore, it was estimated that about 3,500 children would be found in the families of these men. This illustration from the insurance statistics of one year alone suggests that there are tens of thousand of children in the United States who are indebted to the antituberculosis movement for what home care and preparation for life's work they are now receiving. The dividends on public health work against tuberculosis are paid not only in terms of lives saved, but of families conserved.—*Declining Tuberculosis Death Rate in Adult Life, Statistical Bulletin, Metropolitan Life Insurance Co., June, 1922, iii, no. 6, 5.*

Decline in the Death Rate, 1901-1910, and 1910-1920, in the United States.—The gross death rate from all causes in the original registration States declined from 17.2 per 1,000 in 1900 to 15.6 in 1910 and 13.9 in 1920, a decrease of 9.3 per cent in the first decade and 10.9 per cent in the second decade. If we take into consideration the fact that a secondary but severe epidemic of influenza-pneumonia occurred in the early part of 1920, the indicated decline from 1910 to 1920 is less than it would have been had 1920 been a normal year. In 42 cities in the United States having a population of over 100,000, the excess death rate during the 1920 epidemic period from influenza-pneumonia alone was about 1.13 per 1,000. If the same excess may be presumed to have occurred in these original registration States, the death rate in 1920 would have been approximately 12.8 per 1,000, and the decline from 1910 would have been about 18 per cent.

A comparison of the specific death rates and the expectation of life at various ages for the three periods suggests that, in addition to the accelerated decline in the mortality rate during the decade 1910–1920, some extremely interesting and highly significant changes have taken place. Such a comparison has been made possible in a table recently published by the statistical bureau of the Metropolitan Life Insurance Company in its *Statistical Bulletin* for May, 1922. The table is reproduced below (table 1).

TABLE 1

Death rates per 1,000 and complete expectation of life in original registration States, 1901, 1910 and 1920

AGE	1901		1910		1920	
	Death rate per 1,000	Complete expectation of life	Death rate per 1,000	Complete expectation of life	Death rate per 1,000	Complete expectation of life
Under 1	124.48	49.24	114.62	51.49	90.11	54.29
5	6.05	54.98	4.66	56.21	4.43	57.19
10	2.67	51.14	2.27	52.15	2.12	53.06
15	3.47	46.81	2.84	47.73	3.13	48.66
20	5.89	42.79	4.68	43.53	4.68	44.54
30	7.97	35.51	6.51	35.70	6.55	36.80
40	10.10	28.34	9.39	28.20	7.94	29.14
50	14.59	21.26	14.37	20.98	12.76	21.54
60	27.02	14.76	28.58	14.42	25.66	14.69
70	56.41	9.30	59.52	9 11	59.48	9.13
80	127.23	5.30	130.28	5.25	128.88	5.32
90	252.95	2.95	249.62	3.03	247.63	3.02
100	453.73	1.58	401.91	1.85	398.70	1.87

The comparison is more easily made if the differences between the rates at each age and the percentages of decrease or increase are shown, as in the following table:

Increase or decrease in the death rate at specified ages, 1910 over 1901, and 1920 over 1910 in original registration states

AGE	INCREASE (+) OR DECREASE (−)			
	Rate per 1,000		Per cent	
	1910 over 1901	1920 over 1910	1910 over 1901	1920 over 1910
Under 1	−9.86	−24.51	− 7.9	−21.4
5	−1.39	− .23	−23.0	−49.4
10	− .40	− .15	−15.0	− 6.6
15	− .63	+ .29	−18.2	+10.2
20	−1.21		−20.5	
30	−1.46	+ .04	−18.3	+ .6
40	− .71	− 1.45	− 7.0	−15.4
50	− .22	− 1.61	− 1.5	−12.2
60	+1.56	− 2.92	+ 5.8	−10.2
70	+3.11	− .04	+ 5.5	− .1
80	+3.05	− 1.40	+ 2.4	− 1.1
90	−3.33	− 1.99	− 1.3	− .8
100	−51.82	− 3.21	−11.4	− .8

Keeping in mind the facts that we are considering a limited area and that changes in the character of the population arising from the flow and ebb of immigration may have been factors influencing the death rates at certain ages, it may be observed that

1. In the period of 1901–1910, there was no decrease in the death rate in the principal older ages, from about 50 to 80, the chief declines being at the ages of 5 to 30. The decrease in the rate among infants under one year of age was only 8 per cent as compared with approximately 20 per cent in childhood, adolescence, and young adult life.

2. In the period 1910–1920, on the other hand, the greatest decline occurred in the death rate among infants and young children. A marked change in the trend of the rate for middle and old age is also evident. Instead of insignificant decreases or actual increases as found in the rate at the ages of 40 and over in the period 1901–1910, the percentage of decrease in the period 1910–1920 was quite definitely significant (10–15 per cent) at the ages of 40, 50, and 60, and only became insignificant at the ages of 70 and 80.

3. The increases in the death rate at the ages of 15 and 30, and the absence of change at the age of 20 in 1920 as compared with 1910, may be accounted for partially by the peculiar age distribution of deaths due to the influenza epidemic in the late winter and early spring of 1920. An accurate estimate of the abnormal mortality at various ages in 1920 is almost impossible, because of the difficulty of establishing a satisfactory normal age distribution for 1920 of influenza-pneumonia deaths, as well as of deaths from certain other causes that apparently increased during the epidemic period. But from such data as we have immediately at hand, the death rate from influenza-pneumonia alone during the 1920 epidemic was about five times as high as the usual rate from influenza and pneumonia in the age periods "0–14" and "45 +," and about twenty times as high as the usual rate in the age period 15–44. It appears certain that had it not been for the epidemic of influenza in 1920, the death rates in that year at the ages of 15, 20, and 30 would have shown a decline over the corresponding rates in 1910. How much of a decrease would have been indicated is at the present time difficult to say.

The changes in the death rates have altered materially the complete expectation of life in 1920 as compared with 1910 and 1901. From the figures prepared by the Bureau of the Census and the Metropolitan Life Insurance Company have been computed the increases or decreases in the expectation of life in 1910 over 1901 and 1920 over 1910, as shown in the following table:

Increase or decrease in complete expectation of life at specified ages: 1910 over 1901 and 1920 over 1910: original registration States

AGE	INCREASE (+) OR DECREASE (−)		
	1920 over 1901 (years)	1910 over 1901 (years)	1920 over 1910 (years)
Under 1	+5.05	+2.25	+2.80
5	+2.21	+1.23	+ .98
10	+1.92	+1.01	+ .91
15	+1.85	+ .92	+ .93
20	+1.75	+ .74	+1.01
30	+1.29	− .19	+1.10
40	+ .80	− .14	+ .94
50	+ .28	− .28	+ .56
60	+ .13	− .34	+ .27
70	− .17	− .19	+ .02
80	+ .02	− .05	+ .07
90	+ .07	+ .08	− .01
100	+ .29	+ .27	+ .02

The "expectation of life" tells the story in a better way than do the mortality rates. In 1910, at the ages of 40 to 80 the expectation of life had actually decreased over what it was in 1901. But in 1920, in spite of

abnormally high mortality, especially in certain age groups, from the influenza epidemic, there was a gain in the expectation of life over 1910 in practically every age shown.—*The Decline in the Death Rate, 1901–1910, and 1910–1920, U. S. Public Health Reports, July 7, 1922, xxxvii, 1625.*

Rôle of Three Types of Tubercle Bacilli in Human and Animal Tuberculosis.—Between the eugonic human and the dysgonic bovine strains of tubercle bacilli there is a tendency toward the production of a continuous series, but there is no actual overlapping of types. Standard virulence is encountered in most strains, the abnormal types being met with very rarely. No truly transitional strains have yet been found. To infection with the bovine type of tubercle bacillus probably all mammals are susceptible, more or less, and no animal is known with the single and doubtful exception of man, which is more susceptible to infection with the human type of bacillus than to that of the bovine type of bacillus. A table indicating the susceptibility of various animals is included. The rabbit is almost the only mammal which shows any great susceptibility to infection by the avian type of bacillus. The rat and the mouse can be infected experimentally with this type and they may be infected spontaneously also. The donkey is the most resistant to tuberculosis of all our domesticated animals; among birds, swans, geese and ducks are seldom tuberculous. Foreign animals kept in captivity seem to be infected at least as often with the human as with the bovine type of bacillus. The former type has been found in many species of monkeys and in antelopes and elephants. The parrot, when kept as a pet, is commonly infected with the human type; in zoological gardens tuberculous parrots are usually infected with the avian type, while inoculation experiments show that the bovine type is more virulent for the bird than either of the other two types. Both mammalian types may infect the dog but never the avian type. It is difficult to determine whether one or the other type of mammalian tubercle bacilli is more virulent for man, because we possess no experimental evidence as we do in the case of lower animals. Animals that are very susceptible experimentally to tuberculosis may be naturally free from it. Thus, the rabbit escapes the disease in spite of extreme susceptibility, while the dog occasionally succumbs in spite of high powers of resistance. The pig is the only one of the larger domesticated mammals that is susceptible to infection by all three types of tubercle bacilli. Its susceptibility to the human and avian types is, however, low, and resulting disease limited to the submaxillary lymph nodes. It may be that the portal of entry is through the teeth of the lower jaw since the pig suffers commonly from dental caries. The balance of evidence is strongly on the side of stability of type of tubercle bacilli; if a change of type does take place, it does so capriciously and without any obvious reason. In Scotland the incidence of infection of man by the bovine type is unusually great. In primary pulmonary tuberculosis, world figures give a proportion of bovine infections, in nearly 1000 cases, of 0.4 per cent instead of the 1.3 per cent recorded among English cases. There probably is a very considerable difference in the proportion of bovine infections in different countries. A table is included to show the relative parts played by tubercle bacilli of human and bovine types in different clinical varieties of human tuberculosis. In primary pulmonary and primary bronchial node tuberculosis, where aerial infection is most likely, the proportion of bovine infections is negligible. In primary abdominal (intestinal, mesenteric node and peritoneal) and cervical node tuberculosis, where infection occurs through contaminated food (milk) or from air-borne bacilli which have stuck to the pharyngeal mucus and which have either been swallowed or have penetrated locally, the proportion of infections with tubercle bacilli of bovine type is much higher,—about 50 per cent. Hence, the fact that bovine types are so frequent in cervical nodes and so rare in bronchial nodes is strongly opposed to the view that tubercle tracks downward from node to node, extending in this way from the neck to the thorax and so to the lungs. In order to hold this view we should have to assume that only tubercle bacilli of human type can track in this way. Again, the fact that bovine tubercle bacilli are so frequent in mesenteric nodes and so rare in the lungs is in opposition to Calmette's view that pulmonary tuberculosis is commonly caused by bacilli absorbed through the intestinal mucous membrane and carried by the thoracic duct and the innominate vein to the right side of the heart and so to the lungs. If such were the case we should expect to find the same proportion of infections in pulmonary as in abdominal tuberculosis. In the group of lesions, including general tuberculosis, meningitis, tuberculosis of the bones and joints and genitourinary tuberculosis, bovine bacilli are found in about the same porportion of each (16 to 20 per cent). Such lesions usually are the result of dissemination from a primary focus. Probably both aerial and food infections contribute to

this group in the same proportion as they occur as primary infections. Twenty per cent of bovine infections, therefore, may seem high for these blood-borne infections, but we must remember that the majority of such cases as fall into this group occur in early life when infections through the abdominal route, with its large proportion of bovine bacilli, are far commoner than they are later on. In cases of lupus, bovine infections occur in 50 per cent and these are presumed to be surface infections; hence it is that the proportion of infections with one type of mammalian tubercle bacillus is about equal to that of the other. It is more probable that tubercle bacilli become attenuated in the skin than that lupus is caused by attenuated bacilli. Of the deaths attributed to tuberculosis of all kinds about 6.5 per cent are attributable to bovine bacilli.—*The Rôle of the Three Types of Tubercle Bacilli in Human and Animal Tuberculosis, L. Cobbett, J. State Med. April, 1922, xxx, 160.*

Tuberculosis and Traumatism.—When one considers the elasticity of the chest wall and the thoracic contents, it is easily understood how well the whole structure withstands the numerous strains and injuries to which it is subjected. A diseased focus however is inelastic and contains tissues which are abnormally friable, and it may be further immobilized by pleural adhesions. When an injury is received by the thoracic parietes, the strain will be greatest at the point of least elasticity, and one can readily imagine the rupture of an already softened blood vessel or the sudden dislocation of caseous material. There is evidence to support the view that crushing injuries are more serious in their effects than penetrating ones. In 1782 cases of chest wounds (the majority presumably bullet wounds) only 5 were known to have developed tuberculosis subsequently. Experiments do not confirm the theory that when tuberculosis follows trauma the sequence of events is local injury to healthy tissue, effusion of blood, etc., implantation of wandering bacilli with local and then general infection. The rapid clinical course of most cases following injury suggests a sudden massive dose of bacilli such as would occur after rupture of or rapid mobilization in an existing lesion. *Conclusions*: 1. The most careful inquiry must be made into the patient's previous health and associations when assessing the relationship of injury to tuberculosis. 2. To correlate injury and tuberculosis the symptoms must appear promptly (within a few days or weeks) after the injury. 3. The lighting up of an existing focus is infinitely more frequent than subsequent implantation in damaged but healthy tissue. 4. Foci in the mediastinal nodes probably play a more important part in these cases than has generally been supposed.—*The Relationship of Tuberculosis and Injury, N. Tattersall, Tubercle, June, 1922, iii, 400.*

Tuberculous Reinfection of Children.—In order to observe the effect of tuberculous reinfection with tubercle bacilli, studies were made of two groups of children coming in prolonged and intimate contact with adults suffering from open tuberculosis and showing bacilli in the sputum. The first group consisted of eight families in which the tuberculous individual, regarded as the source of infection, showed great numbers of tubercle bacilli in the sputum, whereas in the second group of nine families, relatively few tubercle bacilli were found in the sputum. In the former there were 24 children under fourteen years of age and in the latter, 29 children. In the first group, all children, with the exception of three infants under seven months of age, reacted positively to tuberculin in small amounts (for the most part, the Moro cutaneous test, equivalent to 0.001-0.01 mgm. O. T. subcutaneously). Of the 29 children in the second group, however, only 14 reacted positively, and these before reacting required, in general, much larger doses of tuberculin than in the previously mentioned tests, even as much as 1 to 10 mgm. subcutaneously. The conclusions drawn from the study are that contact with an individual whose sputum shows many tubercle bacilli leads to frequent reinfection, whereas if the bacilli are few in number, the reverse is true. Numerous reinfections with small numbers of bacilli probably occur, rather than massive infection. Constant reinfection over a long period of time causes a sensitization or increased sensitiveness to tuberculin. In practical significance however, reinfection is far less important than the first infection with the tubercle bacillus, and no evidence of an increased morbidity through this factor was found.—*Zur Bedeutung der tuberkulösen Reinfektion, T. Köffler, Arch. f. Kinderhk., lxx, October, 1921, 95.*

Infectiousness of Pulmonary Tuberculosis.—For practical purposes the term "open" designates "infectious," and "closed," "not infectious." Every case of open pulmonary tuberculosis must be considered infectious as long as an open communication exists with a ruptured tubercle and fungoid granulation tissues are present. This also obtains when the separation of

necrotic masses is not continuous, but, as in the "facultative" open cases of tuberculosis, is intermittent. When the local pulmonary findings indicate in the majority of cases a possible rupture of a tuberculous nodule, an intermittent expectoration of bacilli can never be definitely excluded. All such forms must be considered infectious until repeated sputum examinations give no positive results.—*Zur Infektiosität der Lungentuberkulose, A. Winkler, Beitr. z. Klin. d. Tuberk., May 2, 1921, xlvii, 365.*

Statistics of Childhood Tuberculosis.—Comparative observations are given, covering the years 1910 to 1920, with tables and graphs of 10,840 children of the Frankfort Children's Clinic. There was a decrease of tuberculous infection up to 1916–1917, and from then on a marked increase, both in incidence and in severity, occurred. Miliary tuberculosis and tuberculous meningitis especially increased markedly. In conjunction with this, the tuberculosis mortality went hand in hand. On comparing the various age classes, it was disclosed that in the increase of incidence the younger children were especially affected, as was the case also in the increased percentage in mortality or severe fatal forms of the disease.—*Zur Statistik der Tuberkulose im Kindesalter, R. Pape, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 24.*

Tuberculous Lesions Characteristic of Childhood Infection in Lungs of Adults.—In 563 sections of cases dying of influenza, 29 revealed isolated caseous or calcified nodules in the lungs, and similar nodules were not found in the lung apices. The foci were exceptionally numerous, contrary to earlier authors, in the vicinity of the pleura and distributed (except at the apices) in the various lobes. The foci corresponded in localization entirely with those described by Ghon, Escherich and their students and especially by Ranke as primary effects in infants. In view of the youth of most of these cases and the wide calcification of many nodules, the view seems to be justified that this material presented an actual tuberculous infection of early childhood. These observations indicate that the primary effect, in the sense of Ranke, occurs extraordinarily commonly (5 per cent of these cases). This figure is too low, since the apical foci were excluded as possibly secondary, but many may have been primary. It is believed that a large percentage of children pass through a real tuberculous primary affection of the lungs which may cause changes in later life but can in many cases entirely heal.—*Zum Nachweis des Tuberkulösen kindlichen Primäraffektes (Ranke) der Lunge beim Erwachsenen. Untersuchungen an 563 Grippesektionen des pathologischen Institutes Basel, B. Konyevitis, Beitr. z. Klin. d Tuberk., June 10, 1921, xlviii, 73.*

Peculiar Tuberculous Cavitation in Lung of an Infant.—The case reported was a peculiar form of pulmonary tuberculosis of early childhood, occurring at the age of nine months and with multiple cavities. Macroscopically the cavities were of a honeycomb type, of good size, sharply limited and with smooth walls. Exact examination, however, revealed that they were not true ulcerative or bronchiectatic cavities, but infundibular dilatations resulting from destructive and liquefactive processes along the bronchi.—*Über eine eigenartige tuberkulöse Wabenlunge im Säuglingsalter, A. Schott, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 112.*

Increasing Specific Resistance to Tuberculosis in Children.—The specific resistance to tuberculosis of 24 children of the Königl. Poliklinik Maria Christina of Madrid was studied by using the partigens *A*, *F* and *N* before and after a three months' stay at a seaside sanatorium. In all the children there was improvement in general well being, weight and reaction value to the various partial antigens.—*Die Erhöhung der spezifischen Abwehrkräfte gegen die Tuberkulose in Kinderheimen, Verdes-Montenegro, Beitr. z. Klin. d. Tuberk., June 10, 1921, lxviii, 91.*

Histopathology of Positive Cutaneous Tuberculin Tests.—Sections were made from the affected skin area of two patients giving positive tuberculin reactions. The reactions were well marked and the sections were taken two days after injecting the tuberculin. Similar sections were taken, after intracutaneous food tests, from one patient positive to veal, one to beans and one to rice. Two skin sections showing positive luetin reactions were also studied. A study of the histological picture of the tuberculin (Pirquet) test and the food tests disclosed many similarities. In both there was a mononuclear cell infiltration in the superficial connective tissue. In both, when the cutaneous reaction was marked, there was also polymorphonuclear cell infiltration in the deeper connective tissue but the latter was absent in weak food test reactions. In the luetin test, although the reactions were weak, still, in the deep layers of the connective tissue there were marked

inflammatory reaction and necrosis and an entire absence of mononuclear infiltration in the superficial connective tissue. Whether these differences are due to the fact that *Spirochaeta pallida* is cultivated anaerobically, whether this is due to a difference in the culture medium which formed an integral part of both the luetin and the tuberculin utilized in making the respective tests, whether it may be due to a difference in the chemistry of the *Spirochaeta pallida* and the tubercle bacillus, or whether all or any one of these facts may be concerned, must await further investigation. It is concluded that the food test reactions are specific and that the reaction within certain bounds is identical, whether the protein is of food or bacterial origin.—*A Histopathologic Study of Positive Cutaneous Tests. Preliminary Study, A. Strickler, J. Am. M. Ass., April 29, 1922, lxxviii, 1287.*

Aspiration of Particulate Matter.—A summary of the literature on the fate of particulate matter, inhaled and aspirated into the lungs, is given. From this summary it is brought out that particulate matter, including tubercle bacilli, is phagocyted by cells of endothelial origin. The fate of particulate matter entering by way of the eye and nose is also discussed. To obtain information which might eventually suggest the means of applying therapeutic agents to the lung, experiments were done to follow the immediate results of the inhalation of soot and the inspiration or aspiration of india ink (fluid.) Also, by utilizing the information gained, experiments were done with heavy suspensions of dead human and bovine tubercle bacilli on dogs, using the nasal instillation route. It was found that the immediate intrapulmonary distribution of inhaled particulate matter (smoke or soot) differs from that of the inspiration or aspiration of particulate matter suspended in fluids (india ink). The former is found heaped up at the point of bifurcation of the air passages or on any prominent projections seen in the histological sections, with relatively little retained in the alveoli. On the other hand, inspired fluid quickly reaches the alveoli where the insoluble particles are retained for a comparatively long time. Whereas inhaled particles are fairly uniformly distributed throughout the entire lung, when fluid is used the distribution is irregular and its location is determined to a great extent by posture. Pulmonary inspiration or aspiration of fluids after nasal instillation occurs readily in dogs and rabbits under ether anesthesia in the horizontal posture with the head slightly elevated. The inspired fluid is confined to the upper lobes of the lungs and to the side on which the animal lies, while, without anesthetic, repeated nasal instillations are usually unsuccessful in this posture. In the vertical posture, however, without an anesthetic, the inspiration of fluids into the lungs is easily attained in rabbits, but less in dogs, the fluid being found mainly in the lower lobes. By means of an artificial chest, the postural distribution was found to be determined by such mechanical means as gravity and inspiratory suction. Right or left side upper lobe tuberculosis, possessing many of the characteristics of the disease in man, was reproduced in dogs by the nasal instillation of suspensions of dead tubercle bacilli while the animal was under ether anesthesia and lying on the right or the left side during the operation.—*Pulmonary Aspiration of Particulate Matter, Normally and During Anesthesia, H. J. Corper, J. Am. M. Ass., June 17, 1922, lxxviii, 1858.*

X-ray Findings in Lungs after Granite Dust Inhalation.—In attempting to ascertain what type of person is most liable to break down when exposed to granite dust for prolonged periods it was found that a person is a good risk in proportion to the absence of lymphoid tissue in the upper respiratory tract. An apprentice with normal turbinates, a smooth pharyngeal wall, small tonsils, and no evidence externally of enlarged lymph nodes, represented a desirable type and one who under ordinary conditions would last long in the granite cutting industry. But if a man, twenty years old, should have hypertrophic rhinitis, enlarged turbinates and lymphoid nodules on the posterior pharyngeal wall, he would be likely to break down fairly early under present working conditions without dust removing devices. Roentgenographic studies proved that, given the same number of exposure years to granite dust inhalation the cutter with the minimum amount of lymphoid tissue in the upper respiratory tract showed a minimum number of densities on the roentgenogram, while the cutter giving evidence of considerable lymphoid tissue in the upper respiratory tract showed in proportion many densities upon the film. It seems, therefore, that the lung and pleural lymphatics are brought into prominence in this condition. Serial roentgenograms disclosed the fact that it was possible, in order of their sequence, to divide the development of the densities upon the chest roentgenograms into six stages, as follows: *Stage I, that of the hilum:* If the hilum retains its crescentic form, without central enlargement, it is to be assumed that exogenous chemical or bacterial invasion has been near the

minimum. If there are central enlargement and an increase in extent and density of the hilum, it is concluded that the patient has been in an unfavorable respiratory environment, inhaling bacterial or chemical irritants in large amounts for a short period or in small amounts for a long period. The periphery of the hilum may show what region of the lung has been most affected and hilum changes follow fairly closely the lung changes, clearing away when dust inhalation stops and reappearing when it is resumed. When certain pleural densities appear, the hilum changes regress; this is possibly explained by a disappearance of lymph stasis when drainage from the peri hery is cut off. Just external to the ilum and accompanying progressive change in the latter, circular densities develop; they disappear when absence from work occurs and reappear when granite dust is again inhaled. These have usually been considered diseased lymph nodes, but it is concluded that they are really valves in the pleural lymphatics which arrest the irritating material coming from the lung periphery, until the accumulation in the hilum can be moved on. *Stage II, that of linear densities:* This is separated into three divisions. The first division consists of the broad densities in the hilum zone, most noticeable in the descending trunks. These widened linear shadows come and go in granite cutters and seemed to be caused by lymph stasis. The second division consists of linear densities appearing mostly in the midzone of the lung field; they represent septa existing between the lobules of the lung. The third division consists of a network of thread-like markings in the peripheral zone and a portion of the midzone of the lung; they are the last phase of the linear markings to appear and are the forerunner of "thickened pleura." They coincide with the polyhedral pleural rings and overlie the interlobular septa markings. *Stage III, that of circular densities, and stage IV, that of Dunham's fans:* Circular densiti s appear at the junction and on the outlines of the interlobar septa and also on the polyhedral rings. At first a fan-shaped area is outlined by the interlobar septa; then a circular density appears at the apex of this area, the size of the density depending on the behavior of densities peripheral to it when they occur. Fine linear markings then appear within the fan-shaped area and circular densities appear upon the interlobular septa acting as sides of the fan-shaped area. Circular densities develop upon the linear markings within this area and finally it is obscured by a diffuse cloudiness. The circular areas are on the course of lymphatics that are choked with dust and developed only as the process progressed. *Stage V, that of the peripheral haze:* This appears at the lung periphery following the development of all the linear markings and is a forerunner of "pleural thickening." It extends from the clavicle downward. *Stage VI, that of the pleural lymph stasis:* This is represented by a thick haze, developing over the lung, and depends on the extent of lymph stasis in the pleura. X-ray studies indicate that we do not have only one infection by the tubercle bacillus and this occurring in childhood, but that we have innumerable infections all through life, and that the occurrence of a lesion depends in part upon the efficiency of the lymphatics which act as the first line of defense in event of an irritant, either mechanical, bacterial or chemical, entering the lungs by way of inhalation. Twice a year at least a worker in a dusty trade, of which there are 200 in this country, should have an X-ray chest examination to determine the likelihood of subsequent respiratory disease.—*A Conception of the Chest X-ray Densities Based on a Study of Granite Dust Inhalation, D. C. Jarvis, Am. J. Roentgenol., April, 1922, ix, 226.*

Effect of Hemorrhage on Functional Capacity of Heart.—In the first stage of hemorrhage experiments on animals go to show that the cardiovascular system adapts itself to the decreased blood volume by constriction of peripheral vessels; the transfer of tissue fluid into the general vascular channels plays only a secondary part. It is also shown that relatively large quantities of blood had to be withdrawn before an appreciable reduction in the size of the diastolic heart could be established. In the cat the frequency of the heart increases when the loss of blood reaches a value approximately 0.5 per cent of the body weight. Small repeated hemorrhages give rise to a clearly recognizable diminution in the venous return and the heart beats more rapidly, so that the output per unit of time need not be reduced. Continuous slow bleeding finally produces the same results as an equally severe rapid hemorrhage. The initial reduction in the venous return, which becomes clearly apparent when the loss of blood reaches the value of 0.5 per cent of the body weight, is associated with an increase in the frequency of the heart beat. The latter persists until the arterial pressure has reached a level about one-third of normal. The output per beat and per unit of time must finally be greatly diminished. While the arterial pressure is well retained during the early stages of a hemorrhage and may, in fact, rise a few millimetres above normal, it must decrease as soon as the filling of the

cardiac chambers has been seriously impaired. In the experiments outlined this decompensation set in when the loss of blood equalled about 1 to 1.5 per cent of the body weight or slightly less than one-fourth of the total amount of blood. As hemorrhage continues there is a steady decline of carotid and venous pressures, and the mucous membranes whiten perceptibly when the loss of blood approximates one-fourth of the total. Finally, symptoms of cardiac failure appear. The heart then reveals a marked diastolic tendency which is associated with very low arterial and venous pressures.—*The Functional Capacity of the Heart during Hemorrhage, R. Burton-Opitz, J. Am. M. Ass., May 6, 1922, lxxviii, 1377.*

Vital Capacity in Pulmonary Tuberculosis.—This series of observations on the vital capacity in pulmonary tuberculosis was made in the City of Glasgow Sanatorium, Ochil Hills, Kinross-shire, being commenced in October, 1919. Dreyer's methods and standards (*Lancet, August 9, 1919*) were used and a spirometer of the dry type was employed. Each recorded observation was the greatest of four taken. The probable normal was calculated according to Dreyer's formula in terms of combined stem length and chest measurement. A record of the patient's clinical progress was kept separately from vital capacity readings made fortnightly. Observations on 198 cases of intrapulmonary tuberculosis were made; of these 15 were in stage I, 102 stage II and 8 in stage III of the Turban-Gerhardt scale. In the first stage reductions of vital capacity were from 10 to 40 per cent; in stage II, from 20 to 40 per cent; and in stage III, from 30 to 60 per cent. It is thus shown that anatomic changes play a part in determining the reduction of vital capacity. To determine the changes in vital capacity during the course of treatment, 169 patients were divided into 6 groups according to the length of residence, as follows: 24 patients more than 25 weeks; 14 patients, 20 to 25 weeks; 28 patients, 15 to 20 weeks; 46 patients, 10 to 15 weeks; 47 patients, 5 to 10 weeks; and 10 patients 3 to 5 weeks. In these respective groups the following figures represent percentage changes in vital capacity in comparison with the clinical change: Very much improved: 19, 22.9, 19.3 and 21.6 per cent increase; much improved: 14.3, 14.4 10.4, 15.2 and 13.5 per cent increase; improved: 10.3, 11.7, 10.7, 8.6 and 8.4 per cent increase; stationary: +2.1, −0.2, −0.2, −1.0 and −0.05; worse: −1.8 and −5.6. The greater degrees of increase of vital capacity were associated with greater degrees of increase in body weight, but there was a much greater individual variation of change of weight than of vital capacity. While the vital capacity followed very closely the results of clinical appraisal there was no parallel between degree of improvement of vital capacity and length of residence in sanatorium. In improving cases, however, there was a tendency for a continuing rise during the whole period of treatment; there is naturally a limit to this.—*The Vital Capacity in Pulmonary Tuberculosis, (to be continued), C. Cameron, Tubercle, May, 1922, iii, 353.*

Vital Capacity in Pulmonary Tuberculosis.—(*continued*): It is shows that in tuberculous patients the vital capacity often varies independently of the body weight and follows more closely other clinical signs of improvement or deterioration in the patient's condition. In 28 of 90 patients who were admitted to the sanatorium there was an initial fall of vital capacity preceding a later rise; it is advisable therefore to repeat the observation at varying intervals. Such factors as acute coryza, bronchitis, pleurisy or myalgia may lower temporarily the vital capacity. The readings are of no value as an absolute standard, except in cases of excessive diminution and of restricted value as a relative standard. They should supplement and not replace judgment based on clinical findings. *Conclusions*: 1. The estimation of vital capacity by a suitable spirometer is a simple clinical test which even in pulmonary tuberculosis is attended with a minimum of ill effects. No ill effects were observed in the course of 6000 observations. 2. The vital capacity is always reduced in pulmonary tuberculosis, a fact of considerable significance in the diagnosis of doubtful cases. It should, however, be borne in mind that other lung diseases than tuberculosis may effect a reduction. 3. The vital capacity, with certain reservations, is reduced in proportion to the grade of the disease. There are grounds for considering that two elements are concerned in this reduction: (a) the element of toxemia; (b) the element of pathological, structural tissue change. In the early case the probability is that the toxic element is the main factor in causing reduction. In the more advanced case both elements play their parts. The significance of the reduction can only be interpreted in association with the results of careful clinical examination. 4. The vital capacity in pulmonary tuberculosis varies according to the state of the patient, increasing when improvement takes place and decreasing during periods of physical retrogression. A stationary or slightly decreasing vital capacity usually denotes an unsatisfactory pulmonary condition, but in

such cases the vital capacity must be considered in association with the clinical findings, and other possible causes of diminution must be eliminated. Advancing disease is always associated with diminishing vital capacity, but diminishing vital capacity need not necessarily indicate advancing disease. 5. The vital capacity is of limited value in estimating the working capacity of the tuberculous. Excessive vital capacity diminution is not compatible with working capacity, but the more moderate grades of diminution bear no definite relation to it. The upsetting factors here are the varying parts played by the anatomic and toxic elements in the reduction of vital capacity. The fairly advanced but temporarily quiescent type of case may have a vital capacity considerably reduced by causes which are largely anatomical and yet have, within limits, a good working capacity. The moderately early case, where anatomic change is slight but where disease is active and toxic manifestations controllable only by comparative rest, may have a much higher relative vital capacity and yet be quite unfit for any grade of work. 6. The applicability of vital capacity observations to insurance work, pointed out by Hutchinson, appears to be supported by the results which have manifested themselves in the course of the investigation.—*The Vital Capacity in Pulmonary Tuberculosis, C. Cameron, Tubercle, June, 1922, iii, 385.*

Respiratory Disturbances in Tuberculous Meningitis.—Although alterations in respiratory rhythm were noted even by some of the oldest writers, of recent years there has been a tendency to slight this phase of the symptomatology and rather stress the other nervous symptoms, especially variations in the pulse. One of the first pitfalls to be avoided in such a study of abnormal respiration is the confusion which may occur in the presence of miliary tuberculosis of the lungs. The latter affects respiration in a purely mechanical way through encroachment on the respiratory area of the lung, whereas meningitis exerts its influence through the nervous system. Other clinical symptoms, and especially the X-ray picture of the lungs, will permit of a ready differentiation between the two affections. In order to understand the various factors which may influence respiration, it is necessary to remember that the respiratory centre in its broadest sense is not an anatomic, but rather a physiological unit, distributed between cord and brain, and possibly controlled by a coördinating centre. In meningitis one may see (1) stimulation of respiration (in the first stage, with sensory irritation), (2) a reflex inhibition (from peripheral irritation of a sensory nature), or (3) a partial or total paralysis of the respiratory centre. In addition to these purely nervous influences, alterations in the chemical composition of the blood, comparable to those seen in acidosis, may affect the character of the respiration. The frequency of respiration is, in general, independent of temperament and not influenced by lumbar puncture. In acidosis the respiratory excursion is deepened, but otherwise not much modified from the normal type, whereas in the meningeal form there is not only the deep breathing, but respiration is much accelerated and irregular. The slowing of respiration so frequent y seen in the later stages of meningitis is not due to respiratory paralysis, but is rather a reflex inhibition, for this stage is frequently succeeded by a period of greatly accelerated breathing. The lack of parallelism between the changes in pulse and respiration indicates that their centres are not injured at the same time, and again speaks against compression from increased intralumbar pressure being the cause of these changes. Next to changes in frequency, the most striking alterations in respiration are those affecting the rhythm. One of the earliest changes occurring in the first stage (that of sensory irritability) consists in frequent moaning and deep sighing. As the intracranial pressure increases, this is succeeded by changes in the diaphragm (recognizable only in tracings of the respiration) and then, in the second and third stages of meningitis, the wave-like respiration which is merely the forerunner of the Cheyne-Stokes type. Cheyne-Stokes respiration, which may be present in many dissimilar conditions, in tuberculous meningitis depends neither upon circulatory disturbances nor upon changes in the hydrogen ion concentration of the blood, but upon a dissociation of the respiratory impulse. Biot's breathing is rare in tuberculous meningitis, but observations by means of instruments show shallow respiratory excursions even during the periods of supposed apnea. Since all of the irregularities of respiration are reversible, they must be functional in nature, but by careful study of these peculiarities together with the other symptoms one is often enabled to judge of the stage of the disease. They are in all cases due to a functional dissociation of respiration, of nervous origin.—*Beiträge zur Physiologie und Pathologie der Atmung im Kindesalter, IV Mitteilung. Über die Atmungstörungen bei der tuberkulösen Meningitis, A. Eckstein and E. Rominger, Arch. f. Kinderhk, lxx, January 28, 1922, 258.*

Immunity Studies in Tuberculosis.—As an result of studies with *Antikutine*, which is present in the serum of cases of tuberculosis treated with large doses of tuberculin and has the power of uniting with O. T. and preventing or diminishing the intracutaneous reaction to O. T., it is believed O. T. neutralizes the serum reaction. It is not possible to differentiate active and inactive tuberculosis by this neutralizaton phenomenon. The "paradoxical reaction" of Kirch and Czigeti, in which the serum and tuberculin mixture give an increased reaction, is rejected, since of 6 cases of paradoxical reaction 4 gave a reaction with serum and the increased reaction was merely a summation of serum and tuberculin reactions. That specific antibodies are being dealt with in antikutin seems to be borne out by the effects of inoculations of serums and tuberculous exudates. No analogy between antikutins and the immune picture according to Deycke and Much could be found. In a number of cases coincident partigen studies and antikutin tests were performed. It was found that activity of the three individual partigens as well as the combination intracutaneous reaction were diminished by the serum.—*Immunitätsuntersuchungen bei Tuberkulose, A. Frisch, Beitr. z. Klin. d. Tuberk., July 25, 1921, xlviii, 224.*

Immunity and Radiant Energy.—On the basis of twelve studies with light, radium and roentgen raying of the skin and subsequent testing for specific and nonspecific (fats of harmless air bacteria and sarcina) immunity, it was found that the roentgen ray increased nonspecific immunity. Radium increased immunity to the *A* partigens and light rays to *F* and *N* partigens. The light rays also increase the immunity to the *A* partigens and the nonspecific immunity but to a lesser degree. The *L* immunity is not influenced by any of these treatments.—*Immunität und strahlende Energie, C. Timm, Beitr. z. Klin. d. Tuberk., July 25, 1921, xlviii, 195.*

Partial Antigens and Immunity to Tubercle Bacillus Fats.—It was not possible to extract the fats from tubercle bacilli by means of fat solvents (chloroform, ether and absolute alcohol) sufficiently to change their staining properties. Animals treated with these tubercle bacillus fats did not develop, in their blood serum, antibodies toward tubercle bacillus fat suitable for complement fixation tests.—*Über den Stand der Frage der Partialantigene mit Beitrag zur Frage der Immunisierung gegen Fette, M. Liebkind, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 37.*

Partigen Studies.—Variations in the intracutaneous titre go parallel with the clinical picture. On this basis, the titre in favorable fibroid processes is high and indicates that these favorable processes are the results of a high cellular immunity. From this point of view, Szász understands allergy in the sense of biological reactivity changes in the course of immunity. The sources of these allergic possibilities or properties are in the cells of mesodermal origin. Relative to the partial reactivity to *A*, *F*, and *N*, the fat reactivity is considered most important, so that an insufficient fat reactivity can indicate a constitutional disposition to tuberculosis. In this sense, the stability of the reactivity toward the individual partigens is of real value. The titre to *A* shows the least or no variations, while in prognostically unfavorable cases the titre to *N* and *F* is changeable. Intense reactions indicate activity of the immunobiological process, for which reason they are prognostically favorable. This does not, however, indicate that the available reactivity is sufficient to heal the process, and it indicates an active process. The titre can only be of value prognostically when frequently tested and compared with the clinical picture.—*Partigen-Studien, E. Szász, Beitr. z. Klin. d. Tuberk., July 25, 1921, xlviii, 170.*

Choice of Animals for Tuberculosis Experiments.—To administer inoculation doses of tubercle bacilli, dependent upon the weight of the animal, is not exact, especially when dealing with animals of different ages. Three sets of experiments reported on rabbits of different ages and groups indicate that experimental rabbits should be over five months old. It is also advisable to have experimental and control rabbits of the same age and of the same breed. Animals of the same litter should be preferred.—*Zur Wahl der Versuchstiere für experimentelle Tuberkulosestudien, A. Wallgren, Beitr. z. Klin. d. Tuberk., May 2, 1921, xlvii, 423.*

Tuberculin in Diagnosis.—Tuberculins of different makes cause entirely different reactions, when used for diagnosis, subcutaneously or in the conjunctiva. Old tuberculin, Höchst, and O. T., Ruete-Enoch were used. By the subcutaneous method, more focal and general reactions were obtained with Höchst O. T. It is therefore more useful in diagnosis, because it has a "higher toxicity." For therapy an O. T. with "lowest toxicity," one which will cause the least focal and general reactions is advised. O. T., Merck, fulfils this requirement. There is no absolutely dependable tuberculin in the market. The

majority of authorities recognize that diagnosis by tuberculin is a risky procedure, and Sahli especially is against its use for fear of aggravating an existing tuberculous focus in the lungs. A series of 170 cases, injected with 1 to 9 mgm. O. T. at six to twelve day intervals, in which high fever, increased expectoration, bacilli in sputum (heretofore free) followed the injections, is reported. These symptoms, in most of the cases, persisted for from fourteen to forty days; and one patient, a man fifty-one years old, well nourished, with a previous negative history and a present exudative pleuritis on one side as the sole lesion, died from generalized miliary tuberculosis eight weeks after an injection of 1 mgm. O. T., Ruete-Enoch. On many occasions different resuts on the same person were obtained on repeated injections. In some cases of undoubted pulmonary tuberculosis the results of the diagnostic test were negative; while in some very doubtful cases constitutional and focal reactions occurred. This fact brings up a discussion of the specificity of the tuberculin reaction. A brief review of the literature, together with the results of their own experience, causes the authors to doubt its specificity and to look upon it as a general protein reaction. In conclusion, the authors regard the employment of tuberculins for diagnostic purposes as "dangerous, unreliable and unjustifiable."—*Zur Frage der Wirkungsunterschiede von Tuberculinen verschiedener Herkunft sowie der Tuberculinshäden nach diagnostischen Tuberculininfectionen, A. Neustadt and E. Stadelmann, Klin. Wchnschr., January 21, 1922, 166.*

Occult Blood and Bacilli in Feces.—The diagnosis of intestinal tuberculosis is difficult, for symptoms are often indefinite. Therefore, a study for better methods of examination, especially for the presence of blood and bacilli in the stools, was made. In all cases of tuberculous ulceration of the intestines, occult blood could be found by the benzidine test. The guaiac test was less sensitive and of no value. In cases positive by the latter test, there was present ulcer or carcinoma of the stomach or duodenum. If the test was negative, in spite of persistent gastrointestinal symptoms, two processes had to be considered, namely, a toxic intestinal catarrh associated with atrophy and an old intestinal tuberculosis with stenosis. Disease of the peritoneum tends toward intestinal tuberculosis, while profuse and persistent diarrhoea is found more often with catarrahal, atrophic intestinal affections. The determination of the presence of tubercle bacilli is not simple. There is no method of choice. The conclusions are drawn that occult blood in the stools is important, while tubercle bacilli have no diagnostic significance. When tubercle bacilli are present in the sputum they are also present in the feces. Bacilli occur in the feces in inverse ratio to the amount of expectorated sputum. In relatively strong cases with numerous bacilli in the sputum, they were less numerous in the feces than in weak or moribund cases.—*Zur Diagnose tuberkulöser Geschwüre des Darmes (Nachweis okkulten Blutes und von Bazillen im Stuhl), W. Soll, Beitr, z. Klin. d. Tuberk., July 25, 1921, xlviii, 209.*

Character and Cause of Constitutional Symptoms of Tuberculosis.—The constitutional symptoms of tuberculosis are evidences of intoxication. Tuberculous infection may be demonstrated by various methods but the activity of the process can be proved only by the presence or absence of constitutional symptoms. Such symptoms are no less momentous in prognosis, by virtue of their value in determining the patient's functional capabilities. Investigation has suggested that there are no toxins referable to the tubercle bacillus, and it is necessary therefore to explain intoxication of the host on some other basis. The intoxication of ordinary disease must surely develop from the bodily absorption of materials from tuberculous foci. For the following reasons it is believed that the intoxication of the general tuberculin reaction results in large part, if not wholly, through the same proximate mechanism: (1) the general tuberculin reaction is not to be evoked in nontuberculous animals; (2) it is always accompanied in tuberculous animals by the focal reaction; (3) it does not occur in the latter unless focal reaction takes place; (4) close observation of accessible foci will demonstrate unerringly that the focal reaction begins before the first manifestations of the general reaction. Recognition of hypersensitiveness, as revealed by the two phenomena (not necessarily related) of the anaphylactic state and tissue allergy as prominent factors in every phase of the evolution of tuberculous infection is comparatively recent. Eleven years ago, Krause put forward a hypothesis of tuberculous intoxication in disease and during the tuberculin reaction which made anaphylactic hypersensitiveness the underlying factor, and attempted later to prove the hypothesis by experiment. The latter proceeded from the premise that if intoxication was the result of an anaphylactic antigen-antibody reaction, through the absorption of noxious

focal substances formed and released during the reaction, then these substances should be present in excess in foci undergoing tuberculin reaction and be capable of demonstration through their toxic effects on normal nontuberculous guinea pigs. The experiments showed that physiological salt solution suspensions of reacting tuberculous foci injected intravenously into normal guinea pigs killed the animals in from one to four minutes, but it developed that the result was the same regardless of the degree of inflammatory reaction about the tuberculous foci and subsequent investigation demonstrated that nonreacting foci and finally normal organ pulp (lungs, spleens and livers) produced precisely the same effects. The conclusion was that any tissue materials, if in proper physical condition and if put into the circulation in large enough amount in a given time, will poison an animal. Apparently the intoxication of tuberculosis in the natural evolution of the infection is in large measure a nonspecific process, brought about by the absorption of material from foci in amounts large enough to produce symptoms; the severity of the symptoms depends on variable factors, such as the nature of the focus and its location and also the reacting capacity of the host. Interchange between the avascular tuberculous focus and the tissue in which it lies occurs not infrequently through the blood vessels of the latter but chiefly through the medium of tissue lymph. Facility of communication varies with the degree and completeness of tuberculous investment, and activity of communication depends, with everything else equal, on the physiological activity, at any rate, of the tissues around the foci. The focal materials which are poisonous are derived from the constituent cellular elements of tubercle, rather than from bacilli. This is proved by the facts that large doses of tuberculin, representing enormous masses of tubercle bacilli, have no effect on normal animals and that rapidly caseating foci containing comparatively few bacilli often produce symptoms of profound intoxication in patients; the latter is also true of certain stages of generalized miliary tuberculosis. In the tuberculous body the general tuberculin reaction depends on, first, a specific immune process, the focal reaction, and second, the effect of the latter on the body, namely, a nonspecific intoxication brought on by poisonous substances elaborated in the focus and going from there into the circulation. Living bacilli, inoculated, produce a similar effect. A tuberculous animal, so treated, becomes rapidly ill and within a day or two it dies or proceeds to recover. At the height of the illness there is an inflammatory reaction of the old foci of disease resulting from first infection and an acute inflammation of tissues at the points where the reinoculated bacilli have localized. But in an animal with slight and well invested lymph node tubercle the severity of the reaction is much less following the injection of several cc. of tuberculin than it would be following the reinoculation of relatively few bacilli which would represent far less protein than the amount of tuberculin mentioned. The difference is supposedly due to the fact that an animal body, made hypersensitive by prior infection, in some way rapidly degrades bacilli into materials which are poisonous and share in the intoxication. This type of acute intoxication is apparently different from that of ordinary, chronic, focal tubercle and it is best exemplified clinically in previously healthy persons who develop acute tuberculous pneumonia or acute generalized, miliary, tuberculosis, presumably due to autogenous reinfections from older quiescent foci. The symptoms, usually profound, appear rapidly, but it may be days before localizing signs are made out. Such an accident may also occur at any time during the course of an ordinary chronic tuberculosis. Activity of tuberculous foci may occur without implantation of new foci. In other instances, massive reinfections take place, but in perhaps the majority of cases there are small, occasional or frequently repeated reinfections which have been transported by way of lymph or blood or visceral duct. There is a line of reinfection below which its immediate effects will proceed without being detectable. But experimental evidence demonstrates and clinical experience strongly suggests that acuteness of constitutional symptoms always means reinfection. The average patient with tuberculosis first complains of constitutional symptoms and his treatment is successful only when these manifestations have subsided completely. This is the rational basis of rest treatment, the object of which, whether it be applied locally, as in pneumothorax, joint fixation or vocal rest, or as a generally bodily measure, is to lessen the "give and take" between tubercle and surrounding tissue and thereby to promote healing. Under conditions of complete physical rest, as nearly as these are attainable, tuberculosis, unless very acute and active, takes care of itself extraordinarily well.—*The Constitutional Symptoms of Tuberculosis, A. K. Krause, N. York M. J., April 19, 1922, cxv, 441.*

Movable Chest Dulness.—It is almost universally believed that movable dulness in the chest is a sign of the presence of fluid,

but this is sometimes caused by a change in the position of the liver. When the patient is sitting or standing the liver is found to be one or two interspaces higher than it is when he is lying, a striking change in resonance being in consequence produced. This is presumably due to a softness of the liver, causing it to rise when the patient stands and to fall when he lies. It is possible that the state of tonus of the diaphragm is an additional factor in its production. In order not to be misled it is necessary to locate carefully the apex beat and to determine whether or not it is displaced to the left. One must also look for movable dulness in the axilla, as well as in front, and in very obscure cases recourse must be had to the roentgen ray or to tapping. Ulnar percussion of the abdomen, clavicular auscultation to determine the transmission of aortic murmurs and transdigital auscultation for the timing of cardiac murmurs are also described.—*Some Points in Physical Diagnosis, D. Riesman, J. Am. M. Ass., June 24, 1922 lxxviii, 1962.*

Cardiopulmonary Snap.—This sign was observed in two patients with pulmonary tuberculosis. The first had symptoms of pleurisy in the lower left chest anteriorly. In addition, when he lay in a certain position he was conscious of a snapping noise and sensation in the neighborhood of the heart; at other times the snap occurred with each heart beat, especially when he turned slightly toward the left side. On slow inspiration there occurred, over and to the left of the precordium, a palpable and audible snap which was synchronous with one cardiac systole. With the patient turned toward the left side through an arc of about 20 degrees, the snap occurred with each systole when the breath was held at about the midpoint of quiet inspiration. The sound was comparable to a joint snap, as readily palpable but less loud and lower in pitch. The pleurisy improved, but the snap persisted for about four weeks, during which time it diminished somewhat in intensity. The second patient had a pleurisy localized along the right sternal margin below the fourth rib. At times he felt and heard a tap over the lower part of his sternum which seemed to occur with each heart beat; at other times it occurrred with each inspiration. On slow inspiration in the recumbent position, a palpable and audible snap was present over the lower sternum, loudest at the right border between the fourth and sixth ribs. This tap occurred once with each inspiration and occasionaly once on expiration, but did not seem to be related to the heart beat. The explanation of the snap evidently is that, in the presence of pleural inflammation between the heart and the chest wall, the movement of the gliding lung margin is impeded by a pleural surface roughened by an eruption of tubercles of a fibrinous deposit. Cardiac systole, by enlarging the space in which the lung margin is advancing and also by momentarily increasing the negative intrathoracic pressure, permits the lung suddenly to slip past the obstructing area with a snap. When this sound is repeated with each systole there is evidently a diastolic back push to the lung margin which then, with the quicker alteration in relative position of heart and lung on systole, snaps back to its original position.—*Cardiopulmonary Snap, E. A. Duncan, J. Am. M. Ass., June 10, 1922, lxxviii, 1791.*

Changes in Finger Nails after Rheumatic Fever and Tuberculosis.—A series of 300 cases was studied for changes in the finger nails. In some of these the nail plate showed small superficial depressions, from the size of a pin point to that of a pin head. These depressions appear punched out and are deepest in the centre, with slightly sloping sides. They most frequently occur scattered diffusely over the nail plate with no regular arrangement, but they may also occur in horizontal and longitudinal rows. They may be single or multiple and they grow forward with the nail plate. They may occur on all the fingers but have a special preference for the index and ring fingers. The depressions are less distinct on the toe nails. Other changes associated with these depressions are transverse grooves or horizontal furrows, lengthwise grooves or longitudinal furrows, incomplete or transitional group, deformity of the nail, clubbing, etc. The changes are caused by dysfunction of the germimal epithelium of the nail during the course of the disease, the nail marks depending on the localization, severity and duration of the dysfunction. The changes were found in rheumatic fever and its resulting manifestations, and in tuberculosis. It is emphasized that they are seen in the tuberculous only when the disease is active. *Comment and Conclusions:* 1. Small circumscript depressions (pocking, stippling), frequently associated with other changes, occur in the nails following acute rheumatic fever and chorea in approximately 95 per cent of the cases, particularly when heart complications are present. These changes are temporary and may disappear, to reappear after a recurrence of the same disease or some other infectious disease. One may see these changes as late as fifteen years after the last attack of rheumatic fever. They do not appear as a rule before six weeks have elapsed after the patient is taken ill, and

often appear at a later date. The earliest time of their appearance is five weeks. The nails of all patients with heart diesease should be examined for these changes. It is felt that these changes, occurring in the absence of active tuberculous disease and with an associated heart lesion, are confirmatory, though not definte evidence, that the patient has passed through an attack of acute rheumatic fever or chorea, and that a heart lesion, if present, is probably rheumatic in origin. Several cases of valvular disease of undetermined etiology have shown these changes. 2. These changes also occur in active tuberculosis in 70 per cent of the cases, but they are often associated with transverse and longitudinal grooves and clubbing of the finger nails. 3. The depressions have been found in 4.5 per cent of control cases, in which no definite cause could be ascertained, and they have also been found occasionally after a variety of diseases, such as scarlet fever, smallpox, empyema, typhoid and Hodgkin's disease.—*Changes in the Finger Nails after Rheumatic Fever and Tuberculosis, W. H. Rosenau, J. Am. M. Ass., June 10, 1922, lxxviii, 1783.*

Value of Tuberculin Reaction.—Tuberculin has been of great service in research. A positive reaction is a certain indicator of anaphylactic immunity to reinfection. In individual cases the diagnostic, prognostic and therapeutic estimation of the tuberculin reaction is not so definite as is its value in research. Of greatest practical significance in practice is a negative finding which definitely excludes the presence of tuberculosis, provided a reliable method was used. In prognosis based on the tuberculin reaction great caution is necessary.—*Die Leistungsfähigkeit der Tuberkulinreaktion, F. Hamburger, Beitr. z. Klin. d. Tuberk., July 25, 1921, xlviii, 219.*

Specificity of Local Tuberculin Allergy of Man.—Tuberculin and diphtheria bouillon give about the same grade of reactions and in about the same number of cases. The reaction to tuberculin was 0=20, I=20, II=19 and III=16 cases; and that to diphtheria bouillon, 0=23, I=17, II=19 and III=16 cases. When grouped according to intensity of reaction there exists a definite relationship, indicating, however, that individual cases may not give an exactly parallel reaction. In order to test the reaction in positive and negative tuberculin cases, 32 children from one to ten years old were tested. Of 15 tuberculin positive children there reacted to diphtheria bouillon 0=6, I=7, II=2 and III= 0 cases, while of 17 tuberculin negative children there were 0=6, I=7, II=3 and III=1 cases, indicating that tuberculous infection did not greatly change the ratio of diphtheria bouillon reactions. The findings agree with those of Sorgo but the conclusions do not.—*Untersuchungen über die Spezifität der lokalen Tuberkulin-Allergie des Menschen, J. Hollo and R. Amar, Beitr., z. Klin. d. Tuberk., May 2, 1921, xlvii, 357.*

Positive and Negative Phases of Tuberculin Hypersensitiveness.—After a tuberculin injection producing a fever reaction there frequently occurs a negative phase which may last several days, and during this time a tuberculin injection of like size does not again produce fever.—*Über die positive und negative Phase der Tuberkulinempfindlichkeit, F. Hamburger and K. Peyrer, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 66.*

Seasonal Variations of Tuberculin Hypersensitiveness.—Cutaneous hypersensitiveness is greater from December to July. This is shown by the tes s with the Pirquet and Moro reactions. Parallel with this higher sensitiveness goes a greater morbidity of ectodermal structures with a spring peak in March and April. It could be proved with phlyctenulae and erythema nodosum, forms associated with tuberculosis, that the peak occurs during these months, although other factors may also be instrumental. Although no seasonal correlation could be established among 57 meningitis cases, there seemed to be a greater incidence of severe open cases of pulmonary tuberculosis in the spring.—*Jahreszeitliche Schwankungen der Tuberkulinempfindlichkeit und mancher Tuberkuloseerkrankungen, K. Peyrer, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 137.*

Oliguria After Tuberculin Injections.—Generally tuberculin injections are followed by an increased urinary excretion, which may operate in removing effusions; but in some cases a diminished urinary excretion was observed, even in the absence of a fever reaction, especially in exudative pleural and peritoneal inflammation. The explanation offered is an overdosage of tuberculin. It may be possible to utilize the oliguria reaction for differential diagnostic purposes in some cases, where the diagnosis lies between primary cardiac insufficiency with general stasis, and residual *polyserositis tuberculosa* with consequent circulatory weakness and universal venous stasis. Other forms of tuberculosis besides the exudative serous type were not studied fo

oliguria following tuberculin administration.—*Über Oligurie nach Tuberkulininjektionen, A. Kirch, Beitr. z. Klin. d. Tuberk., May 2, 1921, xlvii, 429.*

Tuberculin for Animal Testing.—While the three types of tubercle bacilli are biologically and culturally differentiated, this specificity does not appear to be followed with respect to the tuberculin reaction. The human type is not only suitable for use in bovine diagnosis, but is quite generally used for the preparation of tuberculin because of its more rapid and abundant growth on artificial media. In fowls it appears that a greater number of positive reactions are obtained with avian tuberculin. The dependability of the tuberculin bears no relation to the virulence of the organism from which it is made. In the North Dakota State Serum Institute the bacilli are grown on a medium that contains, in each litre, 1 per cent of sodium phosphate 3 grains of beef extract and 5 per cent of glycerol. This is put in 100 cc. amounts, in Erlenmeyer flasks of 300 cc. capacity. From cultures grown on his medium for about three months, old or crude tuberculin is prepared by the method of Koch. For subcutaneous tests this is diluted with 0.5 per cent phenol. The Bureau of Animal Industry uses 0.5 gm. of crude tuberculin in each 4 cc.; the North Dakota State Serum Institute, 0.6 gm. in each 4 cc. For the intracutaneous test the crude product is diluted with at least an equal volume of distilled water. A slightly greater percentage of water (80–120) does not decrease the efficiency of the product, but renders it less viscid. Phenol, because of its irritating properties, is not added for intracutaneous or ophthalmic tuberculins. Ophthalmic tuberculin is prepared from partially concentrated tuberculin, usually by precipitation with absolute alcohol. The precipitate is incorporated in tablets with lactose.—*The Preparation of Tuberculins, A. F. Schalk, J. Amer. Vet. Med. Ass.. May, 1922. lxi, new series xiv, 162.*

Alkali Reserve in Pulmonary Tuberculosis.—The cases were selected from 213 patients with every variety of lesion, the far advanced type predominating. Van Slyke's method was used to determine the bicarbonate content of the blood plasma in terms of percentage by volume of carbon dioxide, and 67 estimations were made on 61 cases. A clinical change for the worse was always accompanied by a mild corresponding drop in the alkali reserve. Comparison of the alkali reserve of the blood with the reaction of the bladder urine showed a tendency for the former to decrease. as the reaction of the urine passed from alkaline to acid. A comparison of the alkali reserve with the temperature shows that an increase above 100°F. was usually accompanied by a drop in the alkali reserve. There was apparently no correlation between variations in the respiratory or pulse rate and the blood alkali reserve. The existence or positive urochromogen or diazo in the urine was indicative of a tendency for the blood alkali reserve to diminish. The conclusions are that there is a moderate depletion in the blood alkali reserve only after the lesion becomes far advanced and is accompanied by rather severe clinical symptoms, such as increased fever, chills and sweats, slight dyspnea and general malaise. The blood alkali reserve in an individual case continues to decrease slowly with approaching death, until a minimum of 50 is reached. The alkali reserve was comparatively low (52) in 2 cases of acute miliary tuberculosis. In 13 cases showing extensive tuberculous involvement of all lobes at autopsy, the average alkali reserve was 56. At no time is there a marked acidosis in pulmonary tuberculosis.—*The Alkali Reserve in Pulmonary Tuberculosis, D. S. Hachen, Arch. Int. Med., May 15, 1922, xxix, 705.*

Blood Proteins in Tuberculosis.—Little interest has been manifested in the total protein content of the blood and serum in tuberculosis. Likewise, little attention has been paid to the statement of Moraszewski (1903) that there is an increased fibrinogen content. In pulmonary tuberculosis there is an increase of serum protein, especially in advanced phthisis, as distinguished from the more cirrhotic forms, while markedly cachectic cases reveal subnormal values though this does not always hold good. Determinations of the fibrinogen content of the blood plasma by the Winternitz refractometric method is of prognostic and diagnostic value. Ninety-six cases of pulmonary and pleural tuberculosis showed that a markedly increased fibrinogen content existed in the nodose and pneumonic forms of pulmonary, the serous effusion and intestinal, and the cirrhotic and bronchial node cases, while a barely appreciably increased or normal finding was characteristic of the latent and dry pleurisy cases. Repeated examinations of the fibrinogen content showed characteristic variations going hand in hand with the clinical course. There was a parallelism between the presence of fever and the fibrinogen content. As regards the origin of fibrinogen it is believed that it originates from the pathological processes which destroy the cell in the diseased areas. Therefore, the fibrinogen content can be

taken as a measure of tissue destruction. In practice, then, this test should differentiate active from inactive tuberculosis.—*Über Bluteiweissuntersuchungen bei Tuberkulose, A. Frisch, Beitr. z. Klin. d. Tuberk., July 25, 1921, xlviii, 145.*

So Called Blood Lipases in Tuberculosis.—Previously it was shown that fibrous and stationary cases of tuberculosis revealed a high lipase serum titre while in caseous, exudative, and cachectic processes it was low. Repeated examinations showed that clinical improvement went hand in hand with a rise in titre and vice versa. There was no parallelism between the *L. T.* (lipase titre) and the lymphocytes. In 46 cases the relation between the *L. T.* and the intracutaneous *M Tb* partigen injection was studied, but no direct parallelism was found. This also was true with *F* (fatty acid) and *N* (neutral fat) immunity and the *L. T.* There was, however, a parallelism in the intensity increase or decrease of the *L. T.* and the *N* allergy. Feeding of butter did not increase the *L. T. Tebelon* (isobutyl ester of oleic acid) given to cases of surgical tuberculosis did not increase the *L. T.*, or the *N* allergy. In guinea pigs injections of *M Tb N* did not increase the *L. T.* In cases of tuberculosis, *M Tb N* also had no definite effect upon the *L. T.* that was not attributable to other causes.—*Die sogenannten Blutlipasen bei Tuberkulose, III. Mittl., A. Frisch, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 15.*

Sedimentation Time of Erythrocytes in Differential Diagnosis of Pulmonary Tuberculosis.—Variation in the sedimentation time of the erythrocytes in man is a nonspecific reaction. The phenomenon is met with in pregnancy, during menstruation, in inflammatory and infectious processes, tumors and serious liver and kidney affections. Grafe gives his findings in 180 cases of pulmonary tuberculosis, as well in normal persons. In healthy persons the sedimentation time in cubic centimetre tubes does not exceed 3 mm. per hour in men and 5 mm. in women. These observations are confirmed by other observers. In all cases where there was a definitely active tuberculous focus in the lungs the sedimentation coefficient (3 cm. and 5 mm. per hour) was definitely increased, so that where the time was normal active pulmonary tuberculosis could be ruled out. Where the figures were not markedly increased, the subjects were given provocative O. T. injections of 0.03–0.1 mgm., a dose which lies far below that which can possibly cause any general or local reaction. By this method, in questionable cases, but where a tuberculous process was suspected, a definite increase in sedimentation time was noted, while in normal and arrested tuberculosis the figures remained the same after the tuberculin injections. A combination of the sedimentation method with provocative tuberculin injections should develop into a valuable diagnostic method for active tuberculosis.—*Zur Differenzialdiagnose der Lungentuberkulose vermittels der Bestimmung der Sedimentierzeit der Erythrocyten, D. Grafe, Klin. Wchnschr., May 6, 1922, 937.*

Serum Reactions in Tuberculosis.—The complement fixation bodies in human tuberculosis sera are lipoidal, because extraction of dried sera with alcohol, chloroform and ether removes them almost completely. When the sera are dried on filter paper and redissolved in saline solution, there is only a moderate loss of fixation power. This indicates that the active substances redissolve readily; while protein does not redissolve readily after drying. Fixation bodies occur only irrregularly in the euglobulin fraction of the serum. They occur in the supernatant fluid in the same concentration as in the untreated serum. The inhibitive bodies in human and certain animal sera appear to be protein in character because they are almost completely precipitated in the euglobulin fraction of the serum. The inhibitive power of guinea pig serum is not regularly increased after protracted anaphylactic shock when the unsaturated lipoids of the serum are increased. The two sera which showed an increased inhibitive power in the experiments probably contained an increased euglobulin content. It is possible that cellular disruption not only increased the unsaturated lipoids from the cell wall in the serum but also occasionally the euglobulin. The inhibitive bodies are not removed by alcohol, chloroform and ether extraction of dried serum. Serum, however, which is dried and redissolved in saline solution shows a marked loss of inhibitive power. This indicates that the substances responsible for the inhibitive reaction are protein in character, as the proteins of dried serum redissolve only incompletely.—*The Relationship of Lipoids and Proteins to Serum Reactions in Tuberculosis, W. R. Hodge and M. F. Maclennen, Jour. Immunol., May, 1922, vii, 253.*

Complement Fixation Test in Active Tuberculosis.—A positive result has been obtained in at least 98 per cent of cases of definite pulmonary tuberculosis, while of 140 cases, selected as nontuberculous controls, there was a negative result in 137. The test has now been performed in approx-

imately 1100 pulmonary cases or controls. Of these, 260 were definite cases of pulmonary tuberculosis, of which all but 5 were positive. Of the 5 negative cases, 3 subsequently became positive. A negative result may occasionally be obtained in very acute cases of pulmonary tuberculosis, due to the shortness of the interval between the invasion of the body by the tubercle bacillus and the onset of symptoms. Except in these rare cases the results of the test suggest that a positive reaction is obtained by the time the infection gives rise to symptoms. In many of the cases which were positive the accuracy of the test has been proved by the finding of tubercle bacilli later. The proof that negative cases are free from active pulmonary tuberculosis is more difficult. About 250 of the 480 cases in which the test was negative were examined clinically; 5 of these subsequently were proved to be tuberculous by the finding of tubercle bacilli in the sputum. The authors report 20 cases which had symptoms pointing to tuberculosis and also had a negative complement fixation test. In all cases reëxamination and in 2 cases autopsy showed an absence of any further evidence of the disease ten to twenty months later, proving the value of the test in the exclusion of active pulmonary tuberculosis.—*The Value of the Complement Fixation Test in the Exclusion of Active Pulmonary Tuberculosis, A. L. Punch and A. H. Gosse, Brit. M. J., April, 1922, no. 3196, 509.*

Complement Fixation Test in Tuberculous Meningitis.—In the one case reported a clinical diagnosis of tuberculous meningitis was made. A positive tuberculosis complement fixation reaction was obtained with the spinal fluid while that with the blood serum was negative. The Parke, Davis & Co. antigen was used, complement being used in 2 units titrated plain, with water bath incubation at 38°C. It is emphasized that the test should be of greatest value where it is positive with the spinal fluid and negative with the blood serum, knowing that the interchange of antibodies between these two body fluids occurs only in slight degree. In the case cited no tubercle bacilli were ever demonstrated in the spinal fluid and an autopsy was not obtained.—*A Note upon the Utilization of the Complement-Fixation Reaction in the Diagnosis of Tuberculous Meningitis, R. A. Kilduffe, J. Lab. & Clin. Med., April, 1922, vii, 427.*

Cultural Characteristics and Virulence of Mammalian Tubercle Bacilli.—The media used for determining the cultural characteristics of tubercle bacilli are bovine serum, 5 per cent glycerine serum, agar, broth, and glycerinated potato. The human bacillus grows luxuriantly on all these and was therefore designated as *eugonic* by the British Royal Commission. On bovine serum a canary-yellow pigment is produced and on glycerine media the growth is in thick, creamy, wrinkled or warty layers; on potato a reddish pigment often shows. The bovine type of bacillus grows less readily and is therefore termed *dysgonic;* no pigment is produced. Bovine tubercle bacilli are arbitrarily divided into three cultural classes representing three grades of virulence. The differences between the human and bovine types and between the several bovine strains are maintained after prolonged subculture, provided they are grown on glycerine free media; these differences disappear when the cultures are grown on glycerine media. The bovine bacillus is highly virulent for the calf, goat, pig, cat, rabbit, guinea pig, anthropoid ape and all species of monkeys and lemurs. Besides man, the human type is highly virulent for the anthropoid ape, all species of monkeys, lemurs and the guinea pig; it has a low virulence for calves, goats, swine, cats and rabbits. The bovine type is slightly more virulent for the guinea pig than the human type. The dog, rat, mouse and fowl are highly and equally resistant to both types; this is especially true of the fowl and pigeon. The dog, rat and mouse show peculiar types of lesions according to the mode of inoculation. A calf, 3 to 4 weeks old, usually dies in 11 weeks after the subcutaneous injection of 50 mgm. of bovine bacilli; the animal may be resistant to smaller doses. The goat usually succumbs to a smaller dose (10 mgm.) within about 7 weeks. This animal, however, is unsatisfactory for routine testing because of the liability of the local and pulmonary lesions to break down and communicate with the exterior. For testing virulence the rabbit is most satisfactory. Intravenous doses of culture should not exceed 0.01 mgm. because larger doses of human tubercle bacilli may produce an acute tuberculosis which is difficult to distinguish from that caused by the bovine type; for subcutaneous inoculation the dose should not be less than 10 mgm. In the rabbit the intravenous method of dosage should be used with caution as 0.01 mgm. of human tubercle bacilli may sometimes cause a rapidly fatal general miliary tuberculosis. After a dose of 0.01 mgm. of bovine bacilli intravenously the rabbit usually dies within 5 weeks: after 10 mgm. subcutaneously, usually within 10 weeks. The appearance of the lesion varies with the duration of life, becoming more widely distributed as time goes

on. A subcutaneous inoculation of 10 mgm. of human bacilli rarely kills a rabbit within 3 months. Man must be classified with the animals which are susceptible to both types of tubercle bacilli. Contrary to the usual view, it is held that the bovine tubercle bacillus is at least as virulent for man as the human tubercle bacillus. Severe and fatal effects from the former are not frequently seen because this type gains access to the body through the alimentary tract and the results are less certain and severe than when respiratory infection occurs, as is usually the case with the human type; the bovine type can cause all the chief types of the disease, however, even the ulcerative pulmonary form. If bovine strains of bacilli are grown for many years on glycerine broth it becomes impossible to distinguish them from eugonic human strains. No variations in the cultural characteristics of the eugonic human tubercle bacillus have been observed during artificial culture. Cultural characteristics of both types of tubercle bacilli are remarkably stable in the animal body and in the human body they are even more stable than is their virulence. Both types retain their characteristic virulence for very long periods in culture on plain egg and serum, but there is a slow diminution in virulence which becomes perceptible after many years. Various observers have reported changes in virulence following passage through the animal body; such findings are probably erroneous and due to contamination during the course of the experiment or to the use of a mixed virus as the starting point. As a result of their experiments the British Royal Commission concluded that transmutation of bacillary type is exceedingly difficult, if not impracticable, of accomplishment by laboratory procedure. While tubercle bacilli are remarkably stable in the animal body as regards cultural characteristics and virulence, the question of stability of virulence of mammalian types in the bodies of cold blooded animals has not been much investigated in England. The author has tested a bovine strain after five years and two months' residence in toad tissues and found not the slightest diminution of resistance or alteration in the cultural characters. There are certain variations of type characteristics that occur under natural conditions. There are dysgonic human strains which, while keeping the usual virulence of the human type, and growing well with pigment formation, are dysgonic on glycerine agar, potato and broth; they differ among themselves in the degree of dysgony, and by subculture on glycerine media a few of them have acquired the typical luxuriance of the eugonic human type. There are also eugonic bovine strains that have grown better, particularly on glycerine egg and agar, than any strain so far obtained from bovine tuberculous lesions. There is no record of a bovine strain with virulence higher than that which is normal for the type. In England, so called human strains reported to have an unusually high virulence for the rabbit and calf have been shown to be mixtures of human and bovine tubercle bacilli. When human strains are apparently more virulent than usual for rabbits it is probable that the exceptional results are attributable to unusually susceptible rabbits. A large number of attenuated strains of both types of bacilli have been isolated, although they are not widely distributed in nature. They have been found most often in the external forms of human tuberculosis, particularly in skin lesions. The author has solated bacilli from 126 cases of lupus. Of these 63 were bovine, 60 human and 3 atypical. Of the 63 bovine cultures, 19 were fully virulent and 44 were attenuated; 14 of the latter acquired full virulence after passage through animal bodies, while 17 remained attenuated, though some were passed through long series of animals for two years or more. Of the 60 human viruses, 17 were of standard virulence and 43 were attenuated in varying degrees. Of bacilli isolated from 52 cases of scrofulodermic abscesses, 32 were of human and 20 of bovine type; 4 of the human and 4 of the bovine were of attenuated virulence and 7 of these came from patients who were suffering or subsequently suffered from lupus. Attenuated strains have also been obtained from one case of intramuscular abscess, one of cervical lymph node tuberculosis and one of peritoneal tuberculosis. Available evidence indicates that tubercle bacilli lose their virulence in lupous tissues. Thus there is no sufficient human or animal source of attenuated tubercle bacilli. Lupus is a frequent sequel of cervical node tuberculosis, yet of 108 cases of cervical node tuberculosis investigated only one yielded an attenuated human strain. Of 5 cases of lupus examined at varying intervals the virulence of the infecting bovine strains was proved to become diminished. The means of differentiating standard types of tubercle bacilli is described above; it is more difficult to distinguish the variants. If the strain produces pigment on bovine serum but is dysgonic on glycerine media, causes typical rapidly fatal general tuberculosis in guinea pigs and has low virulence for the rabbit, the diagnosis is "dysgonic human." If the strain does not produce pigment on bovine serum, grows sparsely on glycerine media, is less virulent for guinea pigs than standard bovine or standard human tubercle bacilli, and is less virulent for rabbits than

standard bovine strains, but produces in the species after subcutaneous or intravenous inoculation a more severe and widespread type of disease than human standard strains, the diagnosis is "attenuated bovine." It has been reported that human tubercle bacilli from different countries differ in their characteristics but three Indian strains were proved to be identical with standard English eugonic strains.—*The Cultural Characteristics and Virulence of Mammalian Tubercle Bacilli and the Circumstances under Which They Vary, A. S Griffith, J. State Med., April, 1922, xxx, 139.*

Modified Ziehl Stain for Tubercle Bacillus.—The modification has the advantage over the original Ziehl's stain in that treatment with picric acid clears the smear better so that sputum rich in cells is better prepared for the examination for the bacilli. It has the advantage over similar preparation by the Spengler method in that eye fatigue occurs less easily, as a result of the protection offered by the blue. The technique is as follows: Stain one to two minutes hot (or twenty-four hours cold) with carbol fuchsin. Rinse with water. Decolorize with 20 per cent nitric acid. Rinse with water. Treat with picric acid-alcohol from one to two minutes (picric acid 5, citric acid 10, distilled water 85, absolute alcohol 100). Decolorize with 70 per cent alcohol. Rinse with water. Counterstain with 0.005 per cent methylene blue, one to two seconds. Rinse with water.—*Eine Modifikation der Ziehlschen Tuberkelbazillenfärbung, K. Kerssenboom, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 105.*

Effect of Heat on Bacteriostatic Power of Gentian Violet.—Gentian violet, a bacterial agent harmless for gram negative organisms at room temperature, may become potent when applied at 50°C. The organism used was "an impeccable strain of gentian-negative B. coli." Contact of this organism with the dye for one hour at room temperature resulted in no inhibition of growth on plain agar. Exposure at 35°C. generally gave the same results although in one series of experiments exposure to the dyes at 30°C. for one and one-half hours resulted in the death of nearly all the bacteria. But, heated at 50°C., the dye becomes an efficient bactericide. Control experiments show that neither gentian violet nor heat is alone capable of bringing about these results; the bacteria must be exposed to the heated dye and not simply to heat and dye. No attempt was made to determine the exact temperature at which the dye becomes bacteriostatic and the strength of dye used is not stated. In explaining this phenomenon no increase in the penetrating power of the stain due to heating could be demonstrated. Also, such stained bacteria were quite as readily decolorized by alcohol and quite as definitely gram negative as those which had been stained with unheated dye. In the belief that the dye should be more toxic hot than cold, for gram positive bacteria, and also bactericidal, when heated, for certain gram negative bacteria, the use of hot dye is especially advised in the treatment of purulent arthritis and the same is true in the use of the dye in the treatment of empyema by lavage and staining.—*The Effect of Slight Increase of Temperature on the Bacteriostatic Power of Gentian Violet, J. W. Churchman, Bull. Johns Hopkins Hosp., June, 1922, xxxiii, 227.*

Light in Relation to Scrofulous Eye Disease.—This condition is especially rare in Java. However, pulmonary tuberculosis is not rare. The absence of the former is ascribed to the scanty clothing and the bamboo houses which allow the skin to be exposed constantly to light and air.—*Scrofulose Augenkrankheiten, L. Steiner, Schweiz. med., Wchnschr., October, 1921, li, 974.*

Phlyctenular Conjunctivitis and Tuberculosis.—There are two views of the origin of phlyctenulae. One looks upon them as manifestations of tuberculosis while the other believes other factors may also have a place in their etiology (the exudative diathesis of Czerny). An exclusive tuberculous origin is doubted. Five children with definite phlyctenular conjunctivitis were seen who reacted negatively to tuberculin. In no case was there a lowering of tuberculin hypersensitiveness. A small number of children with phlyctenulae do not react to exact tuberculin tests, and must therefore be considered to be tuberculosis-free. That tuberculosis is of important etiological significance cannot be questioned, but it cannot be definitely stated that this is the decisive factor in all children reacting to the cutaneous test, since only a part of these can be viewed as having tuberculosis. According to Czerny the etiology may be dual: the affection has an endogenous basis as a constitutional anomaly, the exudative diathesis, and this is released by various exogenous stimuli. To the latter belongs tuberculosis, but besides this there may be measles and other infectious influences.—*Gibt es Phlyktänen ohne Tuberkuloseinfektion? H. Kleinschmidt, Beitr, z. Klin. d. Tuberk., July 25, 1922, xlviii, 188.*

Tuberculosis of Eye Ball.—Tuberculosis of the eye ball is very rare. The following case is presented: Man, thirty-three years old, complained for eighteen years of inflammation in the connective tissue and sclera of the eye. After various modes of treatment the inflammation would recede. This occurred five or six times. Then there was an intermission from symptoms for eight years. Recently, there again occurred an exacerbation, when he was given 60 tuberculin injections, which improved his condition so that he was able to read large print. A year after the tuberculin injections violent pains occurred in the eye (the other eye being entirely normal). Atropin, dionin and tuberculin did not improve his condition which steadily became worse, necessitating ophthalmectomy. The histological sections of the conjunctiva showed dilated lymph vessels and connective tissue lamellae separated by oedema. In these spaces were lymphocytes and plasma cells in large numbers and here and there epithelioid centres were forming. Typical isolated avascular tubercles with giant cells, as well as conglomerate tubercles, were found. The blood vessels were in large degree thrombosed and with obliterated lumina.—*Über einen seltenen Fall von epibulbärer Tuberkulose, R. Bergmeister, Wien. med. Wchnschr., June 11, 1921, lxxi, 1045.*

Sudden Amaurosis Due to Tuberculosis of Optic Chiasm.—A man, thirty-five years old, with tuberculosis of the cecum, in whom complete blindesss to both light and darkness developed within four days, is described. Examination of the eye grounds showed a temporal pallor of both nerve heads. Histological examination of the brain and cord revealed a well-defined extensive conglomerate tubercle of the optic chiasm.—*Ein Fall von plötzlicher Erblindung durch Tuberkel im chiasma nervi optici, I. Sisaric, Wien. med. Wchnschr., March 5, 1921, lxxi, 445.*

Origin and Nature of Primary Exudative Pleurisy.—Of 33 cases of exudative pleuritis 14 revealed familial incidence. The involved side also showed pronounced pulmonary changes: 17 were fibrosed, 14 fibrosed and nodular, and 2 were predominan ly nodular. The interval between the appearance of the first pulmonary findings and the pleuritis was, in 17 cases, less than one year, and in 10 others less than five years. The pleuritis in many cases was preceded by involvement of hilum nodes on that side. In 6 cases there were other lymph node swellings. The view is entertained that pleuritis exudativa initialis has a hematogenous origin, which seems to be borne out by the relative frequency of general lymph node swellings and distant foci (bone, testicular, etc.), shortly or some time after its development. The rarity of pulmonary hemorrhage and the absence of expectoration are also significant. The final solution depends on the study of accidental or sudden deaths, since initial pleuritis rarely occasions death.—*Über die Entstehung und das Wesen der Pleuritis exsudativa initialis, A. Offrem, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 56.*

Hypertrophic Bone Changes in Tuberculous Spondylitis.—Tuberculous osteitis has generally been considered a destructive pathological process, producing a carious degeneration with little or no tendency toward bone regeneration during the acute or active stage of the disease. Limitation of the destructive process is usually brought about by the formation of fibrous tissue in which a deposit of lime salts is strikingly absent. It has long been a common observation that bony ankylosis of the vertebrae does often occur in the later stages of those cases in which sinuses have existed for some time and in which secondary infection has been allowed to creep in. A study of 100 consecutive cases of tuberculous spondylitis in the Cincinnati General Hospital has disclosed 10 subjects in whom hypertrophic bone changes were present during the active stage of the disease. The case histories and X-ray pictures are appended. The condition in 5 patients was confined to monarticular lesions; the other 5 showed two or more attempts at bony bridging in contiguous areas of the spine. In 6 patients with cold abscesses, aspiration or drainage operations were performed. In every case the tuberculous nature of the process was considered established beyond a possible doubt. In one subject who died and came to autopsy the fixation by means of these hypertrophic deposits was well demonstrated; the lamellae of new bone took the same course as the ligamentous fibres of the anterior and lateral spinal ligaments; possibly some of the new deposits occurred within the ligaments. *Conclusions:* Tuberculous spondylitis shows a natural attempt toward spinal fixation by hypertrophic bone changes in at least ten per cent of cases. This natural attempt toward spinal fixation by bony bridging is most likely to occur in that portion of the spine in which there is the greatest freedom of movement, that is, the lumbar region. Bony ankylosis of the spine may occur in tuberculous spondylitis without the presence of a mixed infection, It is possible that many cases of spondylitis.

diagnosed monarticular osteoarthritis, are of tuberculous origin. This condition has not been found, except in those who have attained adult age. Since spinal fixation has long been considered the most rational treatment of tuberculous spondylitis, and since bony fixation occurs naturally in a certain percentage of cases, it would seem justifiable to recommend internal fixation by bone graft or spinal fusion as a most rational aid toward recovery, especially in the adult.—*Hypertrophic Bone Changes in Tuberculous Spondylitis, R. B. Cofield, J. Bone and Joint Surg., April, 1922, iv, old series xx, 332.*

Spontaneous Fracture of Transverse Process of Tuberculous Lumbar Vertebra.—The patient, a negro male, aged 27, was seen November 29, 1920, and complained of a pain in the left thigh and lumbar region which came on suddenly four months previously, while he was doing light work. The pain decreased but the left leg had become weaker and smaller. In the left lumbar muscles there was a swelling near the spinous processes which gave deep fluctuation but was only slightly tender. Forward, backward and lateral bending (especially to the right) caused severe pain which radiated down the thigh. Flexion of the left hip caused severe pain in the back and the thigh. X-ray showed the entire transverse process on the left side of the third lumbar vertebra separated from the vertebral body and lying about 1 cm. from it. The vertebral bodies and intervertebral discs appeared entirely normal. The swelling increased and was aspirated and a thin, grayish pus, sterile on culture, was removed. The abscess was opened and drained and the transverse process, found lying free, was removed. After this the leg pains ceased. The patient died March 31, 1921, from generalized miliary tuberculosis. The bodies of the third and fourth lumbar vertebrae were necrotic; the first and second showed definite but less extensive involvement. Tissue sections showed tuberculosis. The primary bone focus in this case was in the transverse process, since this lesion was much more advanced than the process in the vertebral bodies. The weakened process probably gave way under some slight muscular strain. While rare, tuberculosis is a condition to be considered in fractures of the transverse process. Aspiration in the cases which show fluctuation is useful in differentiating between hematoma and abscess.—*A Case of Spontaneous Fracture of the Transverse Process of a Lumbar Vertebra, Due to Tuberculosis, B. H. Moore, J. Bone and Joint Surg., April, 1922, iv, old series xx, 322.*

Tuberculous Meningitis in Kiel, Germany.—Because of the fact that the incidence of tuberculous meningitis has a fairly definite ratio to tuberculosis in general, and practically always terminates fatally, a study of the vital statistics with this in mind will give reliable information as to the decrease or increase of tuberculosis during the war. Tuberculous meningitis occurs in about 26 per cent of children ill with tuberculosis and in about 8 per cent of adults so afflicted. The study covered the two periods 1907–1913 and 1914–1920. No striking difference was noted between these two periods among the children of the clinic in either the incidence of tuberculous meningitis or tuberculosis in general. In Kiel, the curve representing the death rate from tuberculosis dropped from 1907 to its lowest point in 1914 (from 129 per 100,000 population to 101). Thereafter it rose steadily to its peak in 1918, with 137 deaths per 100,000 population. An apparent reduction in the incidence of tuberculous meningitis during the same period is explained by the fact that the percentage of children to adults was reduced, first, because of a decreased birth rate, and second, by the great influx of adults without families. Illegitimate children, being less well provided for than the legitimate during the war, showed a general increase in mortality from all causes, the percentage of deaths from tuberculous meningitis being two and a half times as great during the second period as before the war. The mortality from meningitis was of course greatest during the early period of childhood. Crowded living and poor social conditions increase the danger from tuberculous meningitis as well as tuberculosis in general.—*Untersuchungen über Meningitis tuberculosa in der Kinderklinik und in der Stadt Kiel bezüglich Veränderung ihrer Zahlenwerte vor und nach Beginn des Krieges, Emma Stelling, Arch. f. Kinderhk., lxx, December 3, 1921, 188.*

Relation Between Menstruation and Tuberculosis.—Observations on 10,216 women and girls afflicted with pulmonary tuberculosis are reported. The average age of menstruation was 15.6 years or earlier than that found for healthy girls. The average among the first stage cases (Turban-Gerhardt) was 16.05 years, agreeing with the normal figure; among those of the second stage, 15 years; and of the third stage, 14.73 years. Of those with favorable prognosis, only 2.95 per cent menstruated before the fourteenth year; of those with questionable prognosis, 31.4 per cent; and with unfavorable prognosis not less than 63.9 per cent. It is believed that early puberty in tuberculous girls is the expres-

sion of a severe infection or a weakened resistance to infection. The first evidences of pulmonary trouble occurred with the onset of the first menses in 1376. The early appearance of the menses should lead us to watch such children carefully, and to send them to sanatoria and health resorts early. An inheritance of early sexual development could not be determined. Those patients in whom the first menses appeared after the eighteenth year had an especially favorable prognosis. The cases of hypoplasia of the genitalia, especially the uterus, belong in this group.—*Beiträge zur Kenntnis der Beziehungen zwischen den Lebensvorgängen des Weibes und Tuberkulose. I. Menarche and A. Scherer, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 7.*

Tuberculosis and Syphilis of Same Lymph Nodes.—Frei and Spitzer review the literature of the symbiosis of spirochaetae pallidae and tubercle bacilli in lymph nodes and report their own three cases along with the results of animal experimentation. In two cases of extensive fistulous cervical adenitis, tuberculous in character, spirochaetae were demonstrated after a recent syphilitic infection. In the third case, that of a man, forty-one years old, butcher by trade, who contracted syphilis six months prior to the examination, and who at the time had a generalized papular syphilide, spirochaetae were found in swollen, caseous epitrochlear nodes (bilateral). The material, inoculated into guinea pigs, produced generalized tuberculosis within five to ten weeks. The patient's previous history, personal and familial, in regard to pulmonary and skin tuberculosis or abrasion on the hands, was entirely negative. Further cultural and animal experimentation with the tubercle bacillus strain, isolated from the infected guinea pigs, proved that the infection was of the bovine type, which is significant because of the patient's trade. In 8 other cases of luetic lymphadenitis, without clinical tuberculosis or history, spirochaetae were demonstrated, but no tubercle bacilli (animal inoculation). In their experimentation on rabbits luetic infection was engrafted on tubercle bacilli (bovine strain) infected animals, and vice versa, but without any influence on the course of either disease. They attribute their apparent failure to influence one infection by the other to the circumstance that the strain of the bovine bacillus was of very low pathogenicity, inasmuch as the rabbits developed only regional tuberculous infection, which healed completely in several months without producing any generalized tuberculosis.—*Zur Koinzidenz von Syphilis und Tuberkulose. W. and R. Spitzer, Klin. Wchnschr., January, 1922, i, 15.*

Influenza and Tuberculosis.—The material at the University Clinic at Rostock indicates that influenza had a dire influence in increasing the tuberculosis mortality and increasing the severity of the course of the tuberculosis originating on the basis of influenza. Influenza has a bad influence upon the immune body formation of tuberculosis; only in cases of increased resistance stimulated by the infection did influenza have a favorable influence, probably because of an excessive stimulation of antibody formation.—*Grippe und Lungentuberkulose, E. Seuffer, Beitr. z. Klin. d. Tuberk., May 2, 1921, xlvii, 352.*

Influenza and Tuberculosis.—There is no immunity to influenza in people infected with tubercle bacilli, but clinically not ill. Influenza favors the development of tuberculosis in these. In tuberculosis cases with clinical manifestations (and with mixed infections) there is a relative immunity, which may vary according to the course and the termination of the influenza. The action of influenza upon the subsequen development of the previously existing tuberculosis is not absolutely unfavorable. The action of influenza upon healed tuberculosis is not unfavorable.—*Grippe und Tuberkulose, N. Ockonomopoulo, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 90.*

Lung Stones.—Lung stones are, in general, rarely observed. Only 16 cases were observed by the author in 16,000 pulmonary cases. They consist mostly of stones which have ruptured into the bronchial lumen and originate from calcified bronchial nodes. The main constituents are carbonates and phosphates of calcium. Silicates were found only in traces, and magnesium carbonate and phosphate, fats and cholesterin were also present. In no case were tubercle bacilli found in the stones, or a real tissue structure of any kind observed. The rupture of calcified bronchial nodes not infrequently leads to small lung abscesses or foreign body pneumonia which rapidly heals after expectoration of the stone. In one case a large bronchial tree was expectorated coincidentally with the stone.—*Über Lungensteine, A. Scherer, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 17.*

Severe Subcutaneous Emphysema Complicating Artificial Pneumothorax.—Artificial pneumothorax on the left side was attempted in this case, but there was no free pleural space and only

20 cc. of gas were injected. This was followed in a few hours by a severe hemorrhage and signs suggestive of a spontaneous pneumothorax, when the hemorrhage ceased. Coughing continued, and, presumably through a tear made by the pneumothorax needle in the lung, air was forced out with each cough. The air passed into the endothoracic fascia and thence to the mediastinum, neck and subcutaneous tissues. The neck and face were first involved and the patient complained of difficulty in swallowing and tightness in the throat. Within eight days he was inflated almost like a balloon and only the scalp, the palms of the hand and the soles of the feet contained no air. The scrotum was much distended and there was dysuria. At the tenth day the emphysema began to diminish but the general condition grew worse and the patient died seven days later. The necropsy showed almost universal surgical emphysema. Superficial surgical emphysema may be avoided by the pressure effected by a firmly secured dressing, applied over the site of injection directly after the introduction of gas. There appears to be no satisfactory device for preventing or treating deep surgical emphysema. But, as a rule, it disappears in a week or two without causing any great discomfort.—*Severe Emphysema Complicating an Artificial Pneumothorax, A. Aronson, Tubercle, June, 1922, iii, 403.*

Pulmonary Circulation in Pneumothorax.—Subjective symptoms (flushed feeling in the head, especially in the region of the neck and other parts of the body), appearing after the injection of 5 cc. of 10 per cent calcium chloride solution, can be used to determine the entrance of the calcium chloride into the right ventricle, the time required for its transport through the lesser circulation and the time for it to reach the precipitating zone in the arterial circulation. The test will determine the circulatory rate through the lesser circulation. Pneumothorax cases did not give entirely consistent results, especially in view of the few cases studied. It is believed that the pulmonary circulation has been retarded by the pneumothorax. It is also believed that marked muscular exercise enhances this circulation, associated with increased heart action and an increase of the respiratory activity. The circulatory rate can, however, be normal in pneumothorax, depending upon the compensatory action of the lung function and the state of the heart muscle. Pressure changes in the thorax, for instance, in chronic bronchitis, are associated with an increased blood content of the lungs. The circulation in the atelectatic lung is diminished. The Valsalva test has an inhibitory action on the circulation.—*Notiz zur Kenntniss der Hämodynamik beim Pneumothorax, J. Hirschsohn and H. Maendl, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 64.*

X-ray Technique for Demonstration of Small Pneumothorax.—By using different exposures for the first and second stereoscopic films it is possible better to portray different parts of the pulmonary anatomy and the method is especially useful to detect small pneumothorax. The technique and criteria of interpretation are discussed.—*Roentgen-Ray Technique for the Demonstration of Small Penumothorax, J. C. Thompson and N. Barlow, Am. J. Roentgenol., April, 1922, ix, 235.*

Incomplete Pneumothorax.—Gwerder coined the term *expansile pneumothorax* (*Entspannungspneumothorax*), but he does not, it seem, define precisely what he means thereby. This is a good term if used instead of the terms, partial or incomplete pneumothorax, when we wish to designate that type of pneumothorax in which the lung is not compressed sufficiently to produce a positive manometric pressure and the expansile function of the lung is not obliterated.—*Über den sogenannten "Entspannungspneumothorax," H. Frey, Zeitschr. f. Tuberk., March, 1921, xxxv, 441.*

Pulmonary Abscess.—To try to determine the mode of transmission of infectious material causing pulmonary abscess, particularly following tonsillectomy, a questionnaire was sent to 1,020 laryngologists in this country and Canada. In reply to this, 202 cases were reported. The mortality in cases operated on was 16 per cent; in those not operated on 7.9 per cent. Symptoms of abscess developed, on the average, 9.5 days after the tonsillectomy; where a tuberculous lesion had previously been diagnosed the time was 6.5 days. *Conclusions*: 1. The vast majority of cases are of inspiratory origin becuse of (a) time of development and (b) involvement of the lower lobes of the lung in 60 per cent of the cases (right lower, 41 per cent; left lower, 19 per cent), being almost the same relative incidence as in cases of inspired foreign bodies. 2. Pulmonary abscess occurs once in from 2,500 to 3,000 tonsillectomies. 3. Blood transmission of infected material causing pulmonary abscess occurs, but in a relatively small number of cases. 4. Lymphatic extension is a rare mode of infection. 5. The semirecumbent and upright positions are not as free from this complication as has been heretofore supposed.—*Pulmonary Abscess.*

An Analysis of 202 Cases Following Operative Work About the Upper Respiratory Passages, W. F. Moore, J. Am. M. Ass., April 29, 1922, lxxviii, 1279.

Diseases of Mediastinum.—Excluding aneurysm, tumors of the mediastinum are the most important group of diseases of this region; almost every type of tumor may be found here. Fibromas, lipomas, chondromas and osteochondromas are of very infrequent occurrence. Myomas may arise from the muscle tissue of the trachea, the bronchi or the esophagus. The tumors most frequently found are lymphsarcoma, spindle cell sarcoma and giant cell or chondrosarcoma. They originate in the loose connective tissue of the mediastinum, in the peribronchial and mediastinal lymph nodes and in the thymus. They are twice as common as in females. Mediastinal carcinoma is usually secondary, but in rare instances may be primary. Simple cysts are of more frequent occurrence than dermoid cysts; dermoid cysts and teratomas are rarer. In 50 per cent of the cases of dermoid cysts symptoms appear before the age of twenty. Hemoptysis is not uncommon, and the sputum frequently has a foul odor and often contains fat droplets and cholesterin crystals. Teratomas occur in young adults, the symptoms manifesting themselves shortly after puberty. Hydatids, gummas and the enlarged lymph nodes which arise in Hodgkin's disease, leukemia and tuberculosis may be found in the mediastinum; intrathoracic goitre is frequently found in the superior mediastinum. The differential diagnosis of mediastinal tumors is discussed at length. Tuberculosis may involve any of the groups of mediastinal lymph nodes, but the tracheals and bronchials are most frequently affected; it is usually secondary to disease in neighboring structures or in those related by lymphatic drainage. It is more common in children than in adults. Caseous abscesses may form and perforate into nearby blood vessels or into the trachea or thoracic duct. The symptoms are fever, wasting, anemia, night sweats, loss of appetite, disturbance in breathing perhaps simulating spasmodic asthma, and cough which may be spasmodic and croupy or paroxysmal and resembling whooping cough. In cases of ulceration into the trachea the expectoration may be purulent or caseous or contain calcareous particles. There is marked dulness over the sternum, particularly when the anterior mediastinal nodes are involved. The Eustace Smith sign may be heard in children. The pressure of the enlarged nodes can be best diagnosed by stereoscopic roentgenograms of the chest. Six case histories illustrating various conditions are appended.—*Differential Diagnosis of Diseases of the Mediastinum, J. Phillips, J. Am. M. Ass., May 6, 1922, lxxviii, 1355.*

Differential Diagnosis of Madura Foot.—Two cases of Madura foot or mycetoma are reported. In the differential diagnosis of this condition one has to exclude actinomycosis, tuberculosis, syphilis, and sarcoma. Madura foot is a chronic disease and the discharge shows the pathognomonic granules, insoluble in acetic acid and containing central clumps of matted mycelial threads. Actinomycosis rarely attacks the foot and is not so chronic. In tuberculosis there may be a temperature reaction, bone destruction and quantities of pus escaping from the sinuses. In syphilis with comparatively as much involvement a positive Wassermann reaction would be expected. In sarcoma, with the exception of the large round cell type so commonly found in bone cysts, the growth would be more rapid and more extensive and probably have metastatic involvements.—*Madura Foot, More Properly Called Mycetoma, G. A. Pagenstecher, J. Am. M. Ass., May 6, 1922, lxxviii, 1363.*

Primary Actinomycosis of Skin.—Primary actinomycosis of the skin is rare. It may be mistaken for blastomycosis, tuberculosis and cutaneous syphilis. The diagnosis is usually self-evident on microscopic examination of the discharge. In treatment potassium iodide is most commonly used and copper sulphate, internally and externally, has been suggested. In the case reported potassium iodide was ineffective. Incision and curettement of the lesion are recommended. The lesion is then covered with gauze kept constantly saturated with Dakin's solution; at intervals moist heat is applied over the gauze.—*Primary Actinomycosis of the Skin, M. J. Baskin, J. Am. M. Ass., May 6, 1922, lxxviii, 1367.*

Principles of Treatment of Tuberculosis.—In the combat of the body against tuberculosis three phases can be differentiated, that of balance on the side of the tuberculosis, that of equal balance between offence and defence, and that of balance on the side of the body. The treatment in the first phase must be conservative, in the second stimulating, and active only in the third (exercise, raying, tuberculin large doses). Gold treatment has a place in the second phase, while the dosage and choice of the toxic or nontoxic tuberculin preparations must be guided by the reaction of the body to its own tuberculosis toxin. In the main

the views and procedures agree with those of v. Hayek.—*Die praktische Verwertung des immunbiologischen Tuberkuloseproblems als einheitliche Grundlage bei der Behandlung des Tuberkulösen, E. Schulz, Beitr. z. Klin. d. Tuberk., June 10, 1921, xlviii, 129.*

Treatment of Bone and Joint Tuberculosis in Children.—The methods of treatment described are those employed at the Lord Mayor Treloar Cripples' Hospital, Alton, Hampshire, England, under Gauvain. The purpose is to give general treatment to improve the patient's resistance and local attention to the specific lesion. The usual general measures are carried out with school work and training in light handicrafts for mental recreation. The three most common lesions in tuberculosis of the bones and joints are spinal disease, hip disease and disease of the knee. In spinal disease it is important to determine whether the process is active, and this is done by placing the child face downward on a bed or table and raising the legs. If the disease is active, the spine will not show the usual well marked curve but owing to muscle spasticity the whole trunk will rise like a board. A case of active spinal caries, with moderate deformity in the middorsal region is treated by recumbency and hyperextension on a spinal box until the disease is quiescent, as determined by the absence of muscle spasm. It is to be remembered however that a certain amount of rigidity usually persists about the neighborhood of the lesion, due to bony or fibrous ankylosis. When quiescence is established the child is gradually raised for a few days in the apparatus to the vertical position, after which it is provided with a celluloid jacket and ambulatory treatment is started. To make this jacket a plaster cast is made of the trunk, with the child slung by a bridle from a gallows, the feet resting on the ground. Into the cast liquid plaster is poured and allowed to harden, forming a "positive" of the size and shape of the child. The positive is then removed from the case and smoothed by the application of plaster cream, and the splint is made by painting on successive layers of muslin with a solution of celluloid in acetone, fifteen or twenty layers of muslin being used. This is cut off the positive, space is cut out to allow abdominal expansion, holes are punched in the splint for purposes of ventilation, the edges are covered with leather and the jacket is strengthened by strips of duralumin. When provided with this jacket the child can be allowed to walk. This splint should be worn from twelve to eighteen months or longer. In cases of cervical caries a special apparatus is employed for immobilizing the head when the child is on the spinal box; when the disease is quiescent the child may commence ambulatory treatment with a celluloid spinal jacket provided with a metal jurymast. Various modifications of the spinal box are indicated in certain types of cases. In cases of marked deformity, the compensatory curves must first be corrected by altering the posture of the patient, raising the pelvis and flexing the head and thighs. Three forces are then applied, as follows: a head extension pulling on the upper part of the spine above the deformity, an extension on the pelvis pulling on the spine below the deformity and a force pushing upward at the site of the deformity. As the deformity becomes corrected, as far as possible, a plaster jacket may be applied to fix the spine in the new position, or treatment may be continued on a wheelbarrow splint or spinal box with hyperextension. The two common complications of spinal disease are abscess formation and paraplegia; the latter is associated usually with caries in the middorsal or lower dorsal spine and is caused by pachymeningitis, pressure from pus formation or direct bony pressure. Recovery usually follows the application of head and leg extensions, until signs such as increased knee jerks, ankle clonus and Babinski's sign disappear. Cases of hip joint disease are treated by recumbency with extension, until they are quiescent, followed by ambulatory treatment, combined with the wearing of a celluloid splint with crutches and patten on the sound foot. To test for activity of the disease Gauvain's rotary muscle spasm is looked for. If the femur on the affected side is cautiously rotated, more especially internally rotated, until no more rotation is possible, and then a further short sharp jerk is given, a reflex contraction of the muscles in the neighborhood of the joint takes place, the muscles taking part in this being the psoas, the oblique muscles and the rectus. The contraction often can be seen and can be felt by placing the fingers in the iliac fossa. If this sign is positive the disease is active; if negative, it is quiescent. In applying treatment the points to be observed are: (1) Any lordosis present must be corrected by flexing the affected thigh; (2) the child must lie flat on its back, so that the anterior superior iliac spines are in the same horizontal plane; (3) the imaginary straight line joining these two spines must be at right angles to the long axis of the trunk. Extension is then applied with the pull parallel to the long axis of the femur. The deformity may then be gradually corrected without upsetting the relative positions of the spines and the long axis of the trunk. It is pref-

erable to continue treatment by extension until the disease is quiescent; this allows in the end greater mobility than when the part is immobilized in plaster, and the danger of recrudescence does not seem to be any greater. About a month after muscle spasm disappears ambulatory treatment is started, and this is continued up to two years or more, discarding in turn the patten and the splint, and finally the crutches. Special conditions call for special modifications of treatment; among these is subtrochanteric osteotomy to correct persisting deformity. In cases of double hip disease, if there is a likelihood of both hips becoming fixed, one should be allowed to become fixed in a position of about 45 degrees flexion, in order to enable the patient to sit. Disease of the knee is treated by extension until deformity is corrected, followed by immobilization in plaster. When the disease is quiescent, ambulatory treatment combined with the wearing of a celluloid splint with crutches and patten may be commenced. Because of the danger of secondary infection and of destroying the limiting structures a tuberculous abscess should never be opened with a knife. The abscess should be aspirated, with care, in order to avoid sinus formation, to pass the cannula through from one-half inch to one inch of healthy tissue before entering the sac. One or more aspirations may be required. Where the pus is thick, aspiration may be done after 5 cc. of the following emulsion are injected: iodoform, 5 parts; guaiacol, 2 parts; creosote, 2 parts; ether, 10 parts; sterile olive oil, 100 parts. This helps to liquefy the pus. If sinuses form, the affected lesion is strictly immobilized. Sea bathing and vaccines may be useful. Where there is a healed bony focus of origin, an injection of Beck's bismuth paste will often cause a sinus to heal. Among adjuvant measures may be mentioned heliotherapy, balneotherapy, chemotherapy, vaccine therapy and the use of X-ray. Of these the most valuable is heliotherapy, the beneficial results being dependent on the power of pigmentation of the patient. Two main types of patients cannot be treated by heliotherapy: the sandy haired, freckled type of child and the pale, dark-haired, cachectic type.—*Surgical Tuberculosis in Children, C. E. M. Jones, J. State Med., May, 1922, xxx, 192.*

Industrial Colonies and Village Settlements for the Tuberculous.—It is not possible to train a town-bred consumptive to be a farm laborer nor to train a disabled man in a new trade and throw him on the open labor market, for he cannot compete with the healthy worker. A prejudice against him develops among his fellow workmen, and trade unions issue an embargo against those who have not served a full apprenticeship. As alternatives, the consumptive must either return to his own trade or he must become a permanent colonist. The Industrial Colony and Village Settlement is an organization set up for consumptives who, having had various periods of sanatorium treatment, find themselves with the disease steadily advancing, their working power becoming daily less and their earning capacity rapidly diminishing. For such as these, who cannot compete in the open labor market, a sheltered existence must be provided. This should be made up of (1) a cheerful and hygienic environment, (2) work in healthy workshops, adapted to their needs, (3) opportunity for immediate treatment for the slightest relapse and (4) relief from economic pressure. In answer to certain criticisms, it has been demonstrated at Papworth that men are quite willing to reside in a village settlement, that town-bred families do not object to the quietness of such a settlement, that a consumptive can be employed at a remunerative wage to turn out goods (the turnover of Papworth industires in 1921 was £ 23,000) and that these goods can be sold in the open market. The human side of the problem is intensely appealing, since after-care amounts to more than the advice to drink a pint of milk a day and keep the windows open. It is not yet possible to estimate accurately the probable length of life in a village settlement, but it seems at present as if the expectation of life of the village colonist is at least twice, possibly three times, that of the sanatorium ex patient with a similar amount of disease. It is not more expensive to send a patient to Papworth Colony, where he receives treatment and training and a chance of permanent settlement, than to give him treatment alone, without training and without a chance of permanent settlement. It is also pointed out that as soon as a patient becomes a permanent member of the village settlement he ceases to be a charge on the local authority of any area from which he may have been sent.—*Industrial Colonies and Village Settlements for the Consumptive, P. C. Varrier-Jones, J. State Med., May, 1922, xxx, 185.*

Results of Sanatorium Treatment at Leysin.—That the outlook in a pulmonary tuberculosis depends above all else on whether it is open or closed, febrile or nonfebrile, is shown by clinical statistics which have been kept in great detail for ten years in the public sanatorium at Leysin. These, always accompanied by temperature curves, and frequently by radiographic schemas,

have been annotated periodically; they contain explicit information of the anatomo-clinical diagnosis made at entrance, and of the modifications in diagnosis necessitated by subsequent events. At the beginning of 1921 a questionnaire was sent to former patients for the purpose of compiling statistics bearing on the results of sanatorium treatment during the years 1912 to 1917, inclusive. Answers were received from 644 former patients; 696 did not reply. This statistical material permits the compilation of two tables. One gives the immediate results of sanatorium care of 2049 patients, treated in an establishment at an altitude of 1450 metres, during a period of nine years (1912–1921). The other gives the later results found in the case of 644 patients who were treated between 1912 and 1918. A study of all the figures permits the formulation of two important laws as well as a number of more special facts. These laws are already known but they receive emphatic confirmation from the figures obtained. They are stated as follows: The general prognosis of pulmonary tuberculosis depends on two principal factors: (1) The presence or the absence of fever; (2) the open or closed character of the lesions. The greater mortality of tuberculosis that is both open and febrile shows that the improvement due to sanatorium care is still more temporary and precarious than when only one of these conditions is present. Arranged according to anatomo-clinical types which, with some modifications, follows Bard's classification, this study confirms his thesis of the essential clinical individuality of these types and the tolerably fixed course of their evolution. Considered categorically, the statistics obtained at Leysin for the different anatomo-clinical forms shows: *1. Abortive tuberculosis.* If the diagnosis is correct, this form is essentially benign and sanatorium treatment will in most cases permanently eradicate the disease. The prognosis ought to be determined by the whole clinical picture rather than by the minutiae of auscultatory findings. *2. Caseous forms:* (*a*) The lobar caseous forms are rare. Only 2 cases were found among 2,049 Although grave the Leysin statistics give 100 per cent of improvement, one case having been treated by pneumothorax, and the other having passed to a chronic state by the formation of a large cavity and secondary transformation to a fibrous form. (*b*) In extensive caseous forms, the prognosis, ordinarily fatal, may be modified favorably in a large percentage of cases if they are treated early by artificial pneumothorax. Among 29 cases there was 1 cure, 10 improved (due for the most part to artificial pneumothorax), and 18 deaths. Of 8 patients treated by pneumothorax, permanent success was achieved in 3 cases, temporary success 4 times, no improvement 1 time. *3. Typical fibrocaseous forms:* (*a*) Cases of the first degree were rare; only 70 among 2,049. This small proportion was partly because a diagnosis of early tuberculosis is exceedingly rare and partly because the first clinical stage of ordinary fibrocaseous tuberculosis is often lacking or, if it exists, gives place in a very short time to the second stage. Cases afebrile from the beginning have the best prognosis; even transient fever makes the outlook more grave. But, all things considered, it is the presence of bacilli in the sputum that constitutes the most unfavorable element; perfect cicatrization of even very small foci requires long and difficult treatment; a year in the best cases. Even complete cures are not always permanent. (*b*) The second degree of ordinary fibrocaseous tuberculosis which passes generally as "moderately" grave has in reality an extremely doubtful prognosis, its curability not exceeding 20 per cent. The Leysin figures for open fibrocaseous tuberculosis give immediate results of 355 cases, 8 cured (several treated by pneumothorax), 216 improved (relative drying up of foci with persistence of signs of evolution, particularly of bacilli in the sputum), and 92 unimproved. But later figures show that among 62 nonfebrile cases 33 are able to work, 1 is still stick and 28 are dead. Of 28 second degree cases which were febrile or subfebrile during sanatorium treatment, 23 are dead, 2 are still sick and only 5 are able to work. The therapeutic conclusions to be drawn are that these types, whenever they have passed the first anatomic degree, or have resisted an attempted cure of some weeks, furnish an indication for pneumothorax treatment, and more especially is this to be considered if patients belong to the poorer classes and have not the prospect of a long time of leisure with climatic and dietetic advantages. (*c*) Third degree fibrocaseous tuberculosis, although it does not exclude the possibility of complete cicatrization or of improvement with indefinite arrest under a favorable environment, is, nevertheless, under the usual conditions of active life at low altitudes, rarely cured or permanently arrested. The immediate results at Leysin were: in 426 cases, 13 cures (mostly obtained by pneumothorax), 201 improvements and 212 failures. The later figures show that of 73 nonfebrile patients, 18 are able to work normally or intermittently (these include pneumothorax cases) and 55 are dead; while of 174 febrile or subfebrile patients, 15 are living and 159 are dead, a mortality of nearly

100 per cent. From this it seems that all unilateral cavity cases, and most nonfebrile cavity cases should be treated by pneumothorax with a minimum of delay. *4. Localized cavity tuberculosis:* To the ordinary definition of this form should be added the characteristic *nonfebrile*. The form includes two sorts of cavitation of which the variety greatly affects the prognosis. Dry cavities, without bacilli in the sputum, are in reality a form of cure rather than disease, and indicate a very good prognosis. Cavities which are sources of purulent secretion containing bacilli are scarcely less grave than third degree fibrocaseous tuberculosis. This form is relatively frequent. Among 59 cases at Leysin the immediate results were: 1 cured, 36 improved and 22 unimproved. Later figures show, in 11 cases: 6 living and 5 dead. Pneumothorax treatment contributed to the improvement. Unless a tuberculosis of this sort is absolutely latent or the patient can devote several years to the cure of the lesion, pneumothorax is indicated. *5. Chronic ulcerofibrous tuberculosis*, a form not distinguished as a separate one by Bard: These are the cases where a tuberculosis of the third anatomic degree has become torpid, the softened lesions forming gross or minute cavities and having become inactive through very extensive fibrous encapsulation and induration. It is useful to distinguish these forms, as regards prognosis, from progressive, febrile third degree tuberculosis, and from the third degree nonfebrile form in which the softening and infiltration bring on the fibrosis. The figures for immediate results in 107 cases are: 1 cured, 6 improved and 44 unimproved. The later statistics of 13 cases show 18 living and 55 dead. The prognosis is slightly better than in extensive developing forms, but even absence of fever does not ensure permanent security. The indications for pneumothorax are good where one-sided lesions predominate. Pleural adhesions are frequent. *6. Cachectic, ulcerofibrous forms:* This is tuberculosis of maturity and old age, frequently originating from old, long tolerated fibrous forms. The evolution is rapid and the prognosis fatal. *7. Fibrous forms:* Those which begin by being fibrous or evolve rapidly to sclerosis. These forms exhibit bacilli of low virulence or great natural resistance of host, and furnish the greater part of "favorable" cases and successful results. At Leysin, of 165 cases of dense fibrous tuberculosis, 107 were cured, 47 were improved and 11 unimproved. The clinical cure is not accomp nied by absolute recovery of respiratory function. The classical observation of the resistance to bacillary infection of arthritic, rheumatic or arteriosclerotic patients is confirmed. *8. Interstitial tuberculosis:* (*1*) Acute granulitis was, as nearly always, fatal in 100 per cent of cases. (*2*) Other interstitial bacilloses, subfebrile and without definite localization, fall into three categories: (*a*) Continuous subfebrile states, (*b*) conditions with positive or nearly positive tuberculous etiology, with tuberculous antecedents, and (*c*) cases with scarcely perceptible lesions which preserve a latent character during long periods. Most of these subjects come under the condition recently reviewed in this journal under the title of *Chronic Bacillary States*. The prognosis for these forms is chronicity for long periods, perhaps for life, and little or no aggravation of symptoms. They are confined almost exclusively to women. The immediate statistics of 85 cases are: 23 cured, 35 improved, 27 unimproved and 1 dead. The later figures of 38 cases (37 women, 1 man), are: 18 working normally, 19 doing part work, 1 sick. The 18 persons doing full work are still suffering from various forms of ill health. *9. Tuberculous bronchitis*, as isolated by Bard, is not a clearly distinct entity. Cases seeming to correspond with his description have, as far as possible, been incorporated in this class. They have been subdivided, according to their evolution, into: (*a*) Superficial tuberculous bronchitis, without recognizable parenchymatous lesions, abacillary or paucibacillary. There were 40 cases, of which 12 were cured, 23 improved and 5 unimproved. These cases are benign but very chronic and extremely recurrent. They are serious through the functional troubles that they produce in respiration and circulation. (*b*) Deep tuberculous bronchitis is little known to practitioners, and the diagnosis of destructive lesions of the parenchyma that they *always mask* is long in being made, owing to the benign character which is attributed to "bronchial râles." Unilateral bronchitis with a chronic course should, on the contrary, be strongly suspected. The sputum usually contains bacteria and the X-ray will usually detect cavities. These cases justify pneumothorax for, sooner or later, they become worse and give rise to caseous bronchopneumonia with a fatal evolution. The immediate results show 39 cases of deep bronchitic tuberculosis with 3 cures (pneumothorax), 25 improved and 11 unimproved. In the later results, only chronic bronchitis without bacilli in the sputum is recorded. Of 18 patients, 11 are able to work, 3 are invalids and 4 are dead. *10. Pleural and pleurocortical tuberculosis.* The prognosis of this type brings out its very distinct autonomy. Two divisions are distinguished which are not completely identical with Bard's sub-

divisions. The first is the pleurocortical tuberculosis supposed to be fibrocaseous because of the presence of more or less moist rales. The second division is the fibrocortical tuberculosis which is purely fibrous. (*a*) Pleurocortical fibrocaseous form: This form is benign in spite of the extensive signs and their apparent gravity. But before establishing a diagnosis it is essential to know whether the sputum contains bacilli or not. If the superficial lesions which appear to occasion the râles and the other clinical signs remain closed, the case remains chronic and benign, or it may even come to a clinical, if not anatomic, cure. If the lesions are open even at a single point the prognosis is graver. The statistics include 127 cases of orinary pleurocortical tuberculosis (with râles): 20 were cured, 84 were improved, and 23 were improved. It would probably have been legitimate to class many of the 'improved" among the "cured," but this was not done on account of the persistence of numerous adventitious sounds at the time these patients left the sanatorium. The later statistics indicate a greater percentage of benignity: of 53 nonfebrile patients with extensive or localized râles and closed lesions 39 are able to work and 14 are dead. (*b*) Fibrocortical tuberculosis is still more markedly benign. The group contains the purely pleural residua of serofibrinous pleurisy, and tuberculosis of pleural origin affecting the cortex of the lungs through an exclusively fibrous process. The statistics contain 137 cases of superficial pleurocortical tuberculosis, some of which also had affections of other serous membranes, especially of the peritoneum. There were 84 immediate cures, 32 cases improved, and 15 unimproved. Tuberculosis of other organs is not included in the statistics. The results emphasize the temporary nature of many of the benefits of sanatorium treatment and point to the importance of giving to many cases, besides the climatic and hygienodietetic advantages of sanatorium care, the additional aid of operative treatment.—*Sur le pronostic et l'evolution des diverses formes anatomo-clinique de la tuberculose pulmonaire, R. Burnand, Rev. d. l. Tuberc., December, 1921, ii, 450.*

Sanatoria for Surgical Tuberculosis—In the treatment of so called surgical tuberculosis, especially in childhood, when operations on bones and extremities as a result of injury to the epiphysis lead to severe growth disturbances, it has been the tendency in the last ten years to use conservative measures more and more. Climatic-dietetic therapy with fresh air and sunlight is advocated. Surgical tuberculosis is going through the same evolution seen in the treatment of pulmonary tuberculosis and the recognition of the value of sanatoria is just being felt in that not only has surgical tuberculosis markedly increased but severe forms are occurring more commonly. Such places for treatment, in the first place, should be in high altitudes, where the sun shines most clearly and intensely, and the diminished atmospheric pressure and slight relative humidity prevent a severe action. Next to the high altitudes comes the seaside. Association of surgical and pulmonary cases is not recommended. Surgical cases require conservative treatment, which should be administered by trained surgeons. Combined treatment is preferred in certain cases, especially to localize the disease. Caseous, soft foci should be emptied through a small incision and wiped with tincture of iodine. Sequestra and extracapsular bones are given operative treatment, while cold abscesses are emptied by puncture, etc. In spite of the enormous healing properties of light, there are cases that cannot be left to this treatment alone. Therefore, strict individualization is necessary.—*Über Volkssanatorien für chirurgische Tuberkulose, O. Bernhard, Beitr. z. Klin. d. Tuberk., June 10, 1921 xlviii, 101.*

Tuberculosis Dispensary Organization in England.—The Departmental Committee, appointed in 1912, made certain recommendations that have never been fully developed because of lack of funds. It was advised that one tuberculosis dispensary might serve a population of 150,000 to 200,000 in densely inhabited areas, but less in rural districts. Menzies and Chapman recommended one whole-time tuberculosis officer for every 160 annual deaths from tuberculosis. An allocation of one visiting nurse per 100 living sputum positive cases on the dispensary books for the first 300, and one per 150 thereafter is reasonable. Dispensary clinics should not exceed three hours in duration and to prevent congestion all patients should be seen by appointment. A simple case record sheet and environmental record are kept. The environmental records are kept by the respective visiting nurses, who enter thereon their reports on the cases, and present them to the tuberculosis officer daily. The nurses also arrange for examination of contacts and assist in laboratory work. The clerical staff cares for the usual routine.—*The Organization and Conduct of Tuberculosis Dispensary Work, W. H. Dickinson, J. State Med., May, 1922, xxx, 208.*

Choice of Cases for Sanatorium Treatment.—The shortcomings of the three stage division of pulmonary tuberculosis, according to Turban-Gerhardt, are discussed and a brief estimate of the newer anatomopathological classifications of Albrecht, A. Fraenkel, Aschoff, Nicol, Bacmeister and Ulrici is given. In choosing the suitable case for sanatorium treatment the division into active and inactive is used, emphasizing that inactive cases do not belong in the sanatorium. The difficulty of differentiating the active from the inactive case is mentioned, the roentgen diagnosis should be cautiously estimated, the overestimation of percussion in early diagnosis is warned against, while the anamnesis and general impression are considered important. Of the active tuberculosis cases, those with unfavorable prognosis should be excluded from the sanatoriums. The proposal to place an age limit on sanatorium cases (about forty years) is not considered acceptable.—*Auswahl für Heilstättenkuren und Prognostik. Heilstättenbehandlung, K. Krause, Beitr. z. Klin. d. Tuberk., October 15, 1921, xlix, 28.*

Routine Work of Tuberculosis Dispensary.—The dispensary with which Dickinson, who is the Tuberculosis Medical Officer of Newcastle-Upon-Tyne, is associated is open from 9 A.M. till 5 P.M. on weekdays. As a rule, the length of a clinic should not exceed three hours. A minimum of fifteen minutes should be allowed for examination of chest and larynx, and five minutes per case under observation. The form in which the records of the patients are kept includes the case sheet containing all the important factors required for correct diagnosis and the environmental record which serves for after-care and prophylaxis. The work of the medical and clerical staff, visiting nurse, and laboratory is outlined.—*The Routine Work of a Tuberculosis Dispensary, W. H. Dickinson, Brit. M. J., April 1, 1922, ccii, 671.*

Advantages of Open Air Treatment.—Chemical impurities have nothing to do with the ordinary stuffiness of a room, as the gaseous interchange through cracks and crannies is sufficient to keep the air close to its normal content of various gases. There is no proof that poison is exhaled in the human breath. It is to be noted that in spite of all the advancement in hygiene and the reduction in the death rate which has taken place in the last fifty years, the proportion of healthiness of agricultural people over town people is as great now as it was years ago. It is not merely a question of greater infant mortality in the cities. In all the manufacturing trades, where people are forced to work under shut-in conditions, a much higher death rate and higher phthisis rate are shown than is the case with those people who very largely are employed in the open air. Many dusts are harmful, especially silica dusts. In factories a suction dust plant can be very effective in clearing the air. In the cities smoke may cut down daylight as much as 40 per cent; most of the smoke is from domestic fires. The body is cooled by radiation, convection and evaporation. In cold, dry climates the inhaled air becomes saturated with moisture at body temperature and in this way aids the cooling process. The flow of moisture over a mucous membrane cleanses it, protects it from disease and helps to cure cases of tuberculosis by sending more lymph and blood through the respiratory tract. The Kata thermometer records not only the effect of the temperature of the surrounding air on the cooling of a surface at body temperature, but also any movement of the air, and how quickly cooling takes place when the surface is wet like the perspiring skin. The instrument can be used to determine whether the ventilation of school rooms, factories etc., is adequate.—*The Science of Open-Air Treatment, L. E. Hill, Brit. J. Tuberc., April, 1922, xvi, 72.*

Horseback Riding in Treatment of Tuberculosis.—Sydenham (1624–1689) originated the idea of treating consumption by prescribing horseback riding for his patients. The following statement, among others, appears in his works: "The principal assistant in the cure of this disease is riding on horseback every day, insomuch that whoever has recourse to this exercise in order to his cure, need not be tied down to observe any rules in point of diet, nor be debarred any kind of solid or liquid aliment, as the cure depends wholly upon exercise." It is probable that some of Sydenham's patients did not have tuberculosis, but in those who did the good effects must have been due to exposure to fresh air. At the beginning of the eighteenth century the method had a short-lived vogue and it is credited with having cured John Wesley. Mechanical apparatus was devised to impart a swinging motion and J. C. Smythe (1741–1821) used such a machine to treat 14 patients; of these 12 were cured, 1 was improved and 1 died. At the beginning of the last century riding sank into final oblivion as a principal means in the treatment of pulmonary tuberculosis.—*The History of Horse-Riding in the Treatment of Pulmonary Tuberculosis, R. J. Cyriax, Brit. J. Tuberc., April, 1922, xvi, 78.*